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Electrical World

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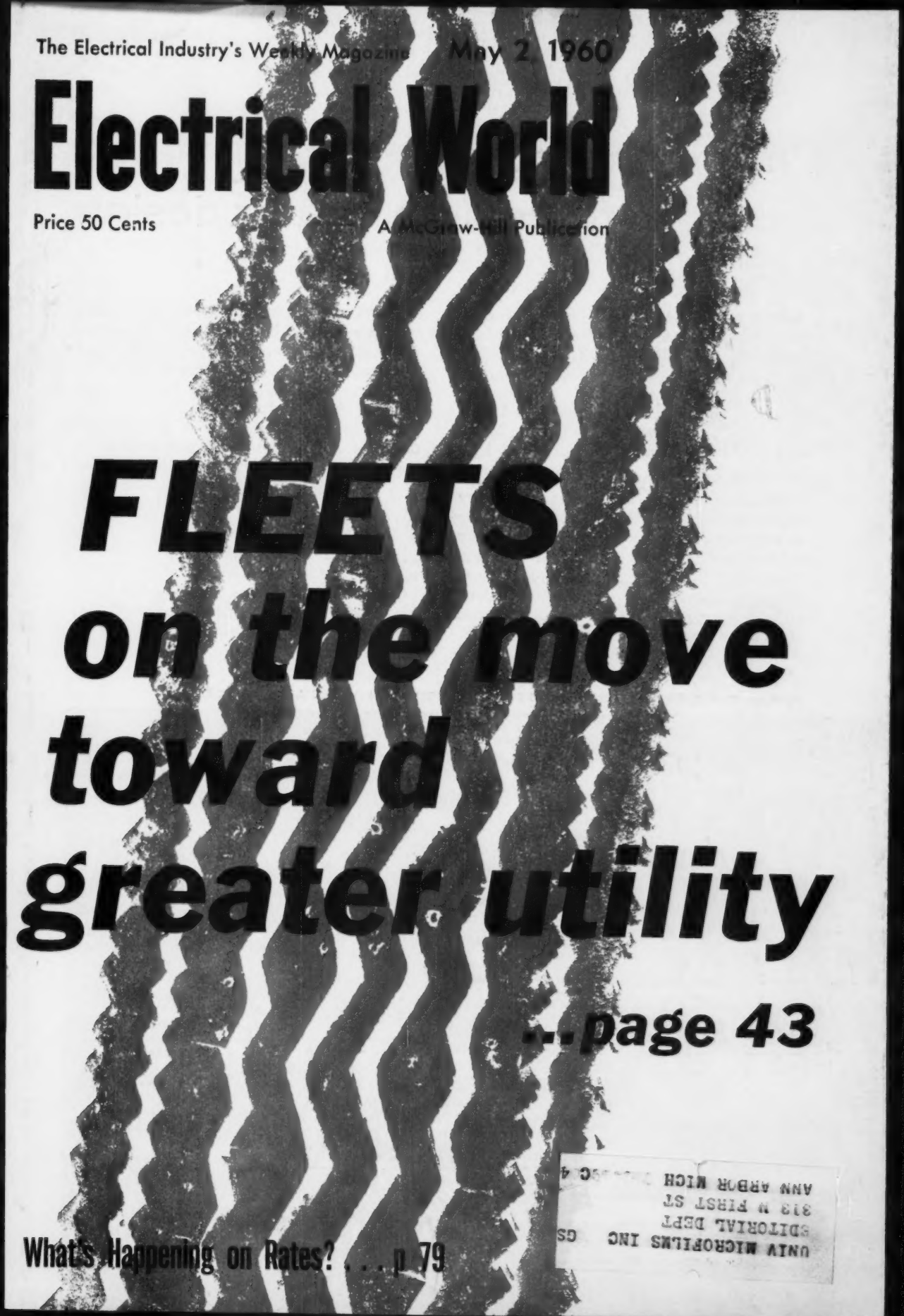

FLEETS on the move toward greater utility

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UNIV MICROFILMS INC
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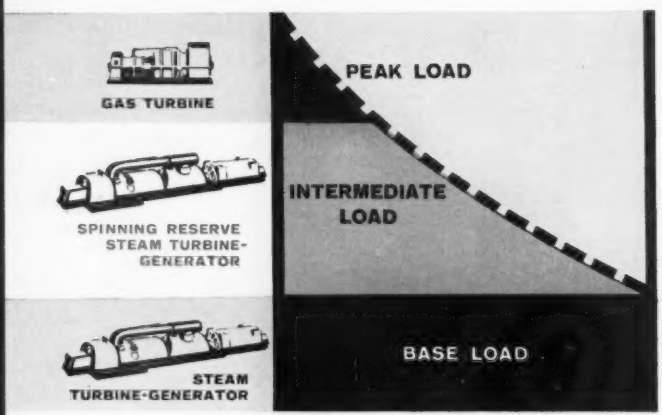
SPINNING RESERVE . .



SPINNING RESERVE turbine-generators are most suitable for use between short-term peak and continuous base loads.

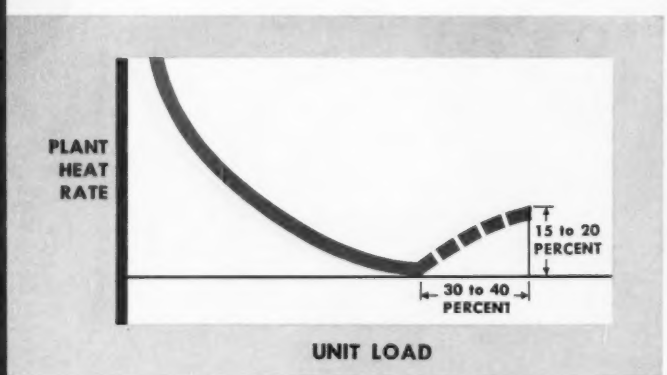
TO HELP KEEP THE COST OF POWER LOW General Electric, with the support and encouragement of its electric utility customers, has traditionally led the way in developing and applying new concepts in power generation.

BASE LOAD generation costs have been steadily decreased through General Electric's pioneering achievements in increasing the capacity and efficiency of generating units.

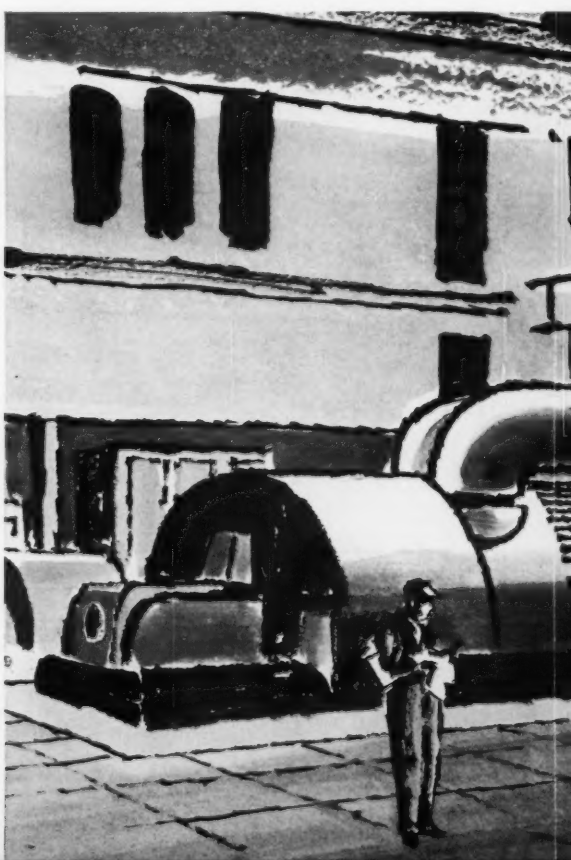
PEAK LOAD REQUIREMENTS can now be met economically by gas turbines with both low installed cost and low operating and maintenance costs.

INTERMEDIATE LOAD-DURATION studies by General Electric have recently resulted in a new concept in turbine-generator design: Spinning Reserve.

SPINNING RESERVE describes a base load unit with low-cost added capacity for patterns of daily maximum load demand which are found on most systems. Units now being developed point the way towards lower initial plant investment.



PROGRESS IN MATERIALS AND DESIGNS now makes possible outputs 30 to 40 percent greater than those established by optimum efficiency.



. . . a new concept in turbine-generator design

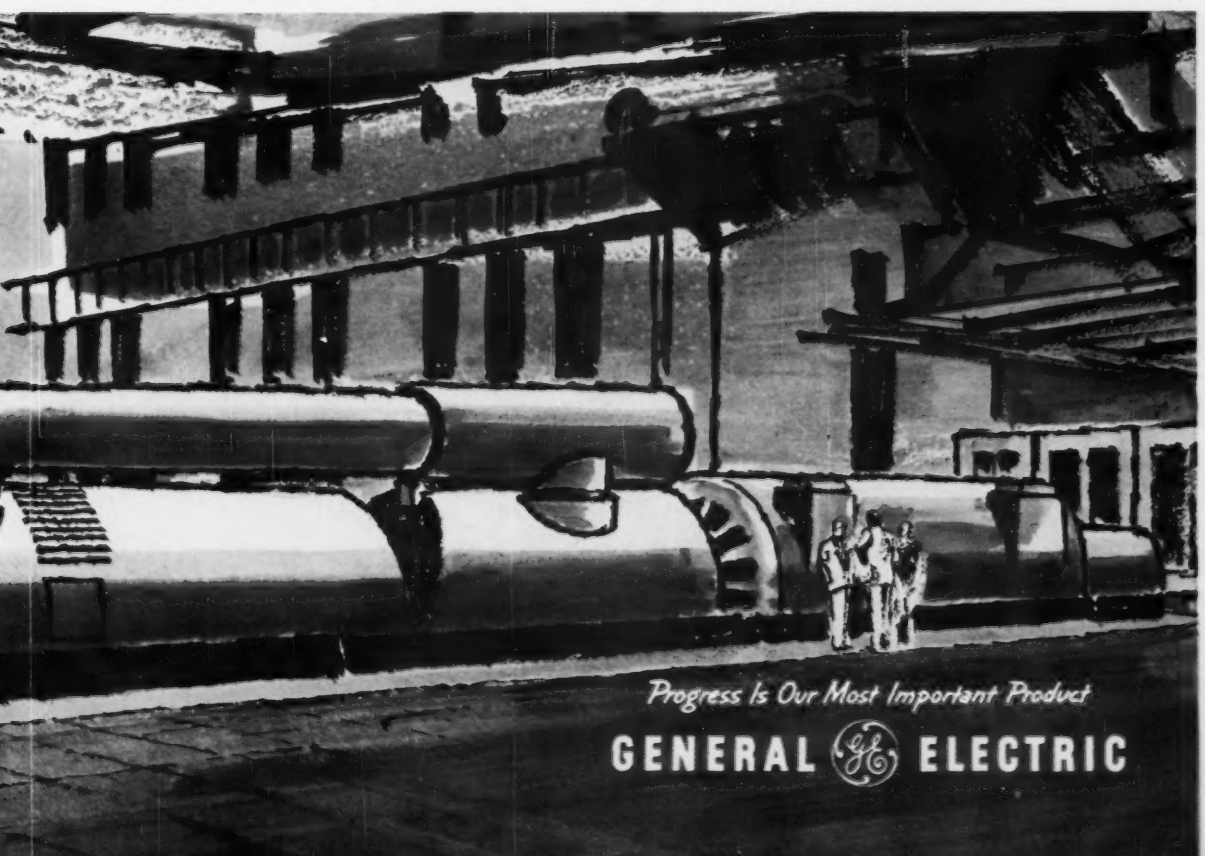
A NEW TYPE OF UNIT, the Spinning Reserve turbine-generator is a high-efficiency base load generating unit with an added good-efficiency, short-time capacity that can be used during the period of maximum daily load demand. Base load unit as used here means a unit that, due to its high efficiency, will normally be operated under incremental loading at high load factor.

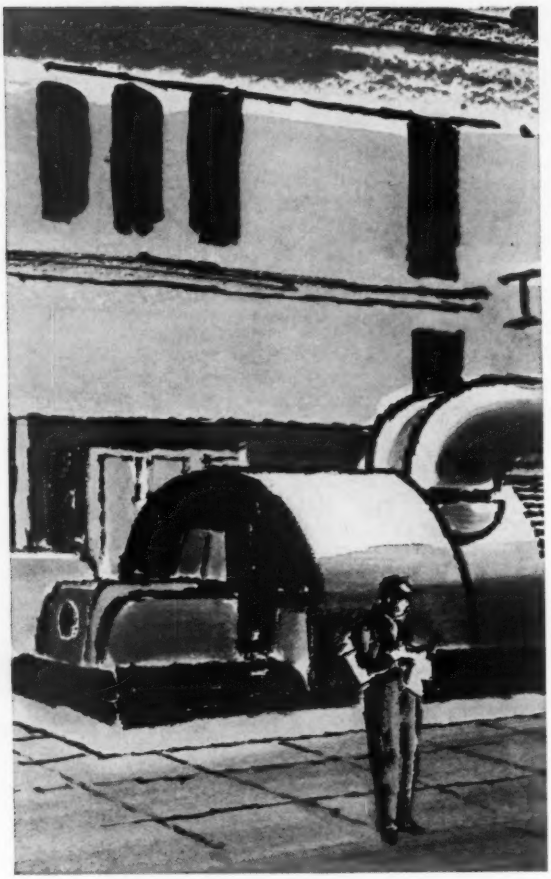
Spinning Reserve installations are more expensive, but more efficient, than gas turbine units. They are less expensive, but also less efficient at maximum output, than base load generating installations. For this reason, Spinning Reserve turbine-generators are most suitable for use between short-term peak and continuous base loads.

INVESTMENT SAVINGS IN SPINNING RESERVE units are realized because turbine-generators designed for optimum efficiency at base load capacity can now be built strong enough to deliver an additional 30 to 40 percent more power with a plant heat rate only 15 to 20 percent poorer than the base. Studies now being made by several electric utilities indicate that comparable additional short-time capacity may be obtained by overfiring the boiler and by using the spare capacity usually available in the plant auxiliaries.

FOR MORE INFORMATION on this new approach, write for a copy of GER-1654, "Large Steam Turbine-Generators with Spinning Reserve Capacity." General Electric Co., Section 301–413, Schenectady 5, N. Y.

SPINNING RESERVE TURBINE-GENERATORS ARE BASE LOAD UNITS WITH LOW-COST ADDED CAPACITY.





General Electric reports on . . .

SPINNING RESERVE

a new approach to lower generating costs

Electrical World

Vol. 153, No. 18 MAY 2, 1960

Published for 86 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

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Electric utilities chalk up some $55 million in rate hikes in 1959: Will 1960 be a $60-million year?.....p 79

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Puerto Rico Builds 115 Kv With Helicopter

Joseph R. Raub, Puerto Rico Water Resources Authority

'Copter directly strings conductor for 115 kv; saving first year nearly covers quarter-million purchase price.....p 38

Special Report

FLEETS on the move

As they enter the decade of the sixties, fleets are being equipped with a wider range of vehicles, offering increased productivity and lower operating costs for utilities. In autos, the trend is to the use of the compact car. In trucks, the trend is to ever greater mechanization and productivity of crews.....p 43

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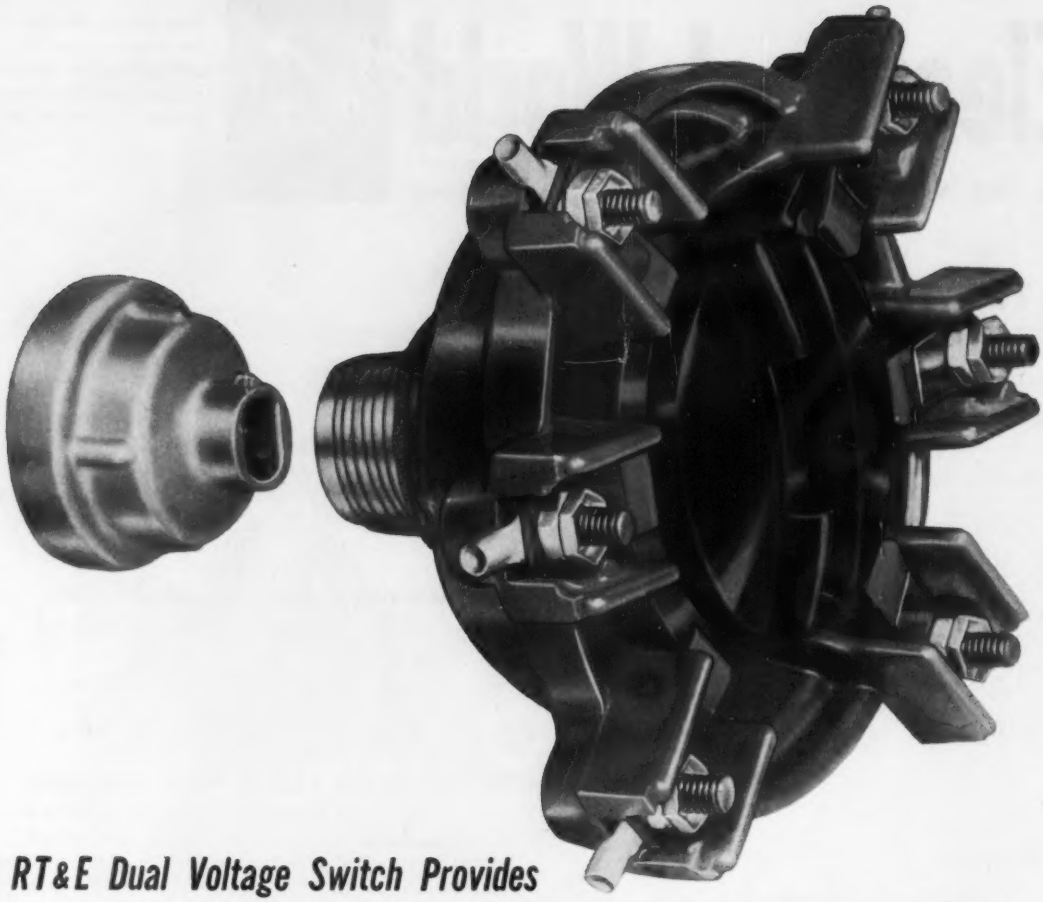


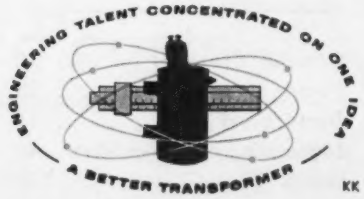
New RT&E Dual Voltage Switch Provides

FOOLPROOF OPERATION

You cannot operate this improved RT&E dual voltage switch incorrectly. It can be moved only with the keyed handle provided, and the switch must be correctly positioned before the handle can be removed. This successor to the industry's first externally-operated dual voltage switch demonstrates further proof of RT&E's four years of dual voltage experience. Improvements include a new body of shatterproof polyester glass, dimensionally, chemically, and thermally stable, and new spring-loaded contacts that assure constant positive contact pressure. In addition, this single switch handles both even and odd multiple voltages. Plan to uprate your system now, with RT&E dual voltage equipment — transformers with more built-in experience.

SAFE! Unique keying action between handle and slotted ring around shaft assures positive positioning before handle can be removed.

RT&E CORPORATION
WAUKESHA, WISCONSIN
PORTLAND, OREGON



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LETTERS

Policy on Mentioning Manufacturers

To the Editor:

We were pleasantly surprised to see on the cover of your Feb. 1 issue pictures and drawings of British Columbia Electric's four-unit gas turbine station at Port Mann. We were likewise pleased and impressed —as we hope and trust your many readers were— with the four-page article describing this fully automatic and unattended plant, largest of its kind in the world.

Our appreciation of the article was matched, however, by our disappointment over the fact that nowhere in the article is Brown Boveri mentioned as the builder of turbines. Needless to say this was a sharp blow to the pride of Brown Boveri which pioneered the development of the utility gas turbine and as evidenced by the Port Mann installation, remains a world leader in the field.

Our thought that this omission may have reflected editorial policy was immediately contradicted by a further perusal of the magazine. Both on the cover and on the inside pages, we noted frequent mention of other manufacturers.

Possibly there is a logical explanation for this seemingly contradictory editorial performance but lacking such an explanation, one is led to suspect that the spirit of fair play took something of a beating here. The stature of your magazine is such that we can hardly believe that you would deliberately discriminate against Brown Boveri because of its Swiss origin but it is almost as difficult to believe that the omission was accidental.

Thomas E. Lucier, Manager
Public Relations
Brown Boveri Corp
19 Rector Street
New York 6, N. Y.

▶ In technical articles we avoid the use of manufacturers' names in the body copy unless omission of such identification would impair the basic understanding of the article, or unless the article describes a significant technical advance unique to the manufacturer. In technical articles, we may use manufacturers' names, if appropriate, in author's by-lines or in photo credits. This general policy does not apply to our Electric Utility Methods special reports or to other departments in the magazine.

We try to administer this policy impartially, and certainly there is no willful discrimination.

This column is your forum in Electrical World. Your comments, observations, or questions are encouraged. It is sometimes necessary to edit letters for space reasons, but we endeavor to be faithful in preserving your viewpoint. Address correspondence to "Letters Editor," Electrical World, 330 W 42nd St, New York 36, N. Y.

"IDEAL TRUCK FOR THE MOUNTAINS"—TORSION-SPRING CHEVY WITH WORKMASTER SPECIAL V8!

Bill Bridges will tell you. He's a driver for Farmers Hardware, Athens, Ga. He's behind the wheel of that V8-powered LCF 6 days a week, 200 miles a day, with a lot of it low-gear mountain-country driving. "You could drive this one even if you've never driven a truck before," Bill Bridges says. "Handles just as well loaded as empty . . . takes curves like a passenger car and it's got plenty of power for long, hard pulls up steep mountain grades." Mr. Douglas Meyer, president of the company, praises his Chevy's 8-9 mpg economy, calls it "remarkable" on a route like this one.

■ The Workmaster Special V8's secret of success is nothing less than a super-efficient combination of high performance, gas-saving economy and high-mileage durability. Wedge-head combustion chambers are fully machined for smooth high compression (7.75 to 1), with short-stroke action pouring out a high 185 h.p. Owners talk about the performance of this engine, astonished at the way it handles big-tonnage loads. The next moment they're talking about its dependability, the way it keeps humming along on a low minimum of maintenance. Drop in on your dealer and check his engine specs in detail. Ask about the new Powermatic transmission, too. Talk engine, models, capacities, everything. Just be sure to save some time for a trial run in a '60 Chevy. You'll see it's like no truck you've ever driven before. You'll also see why so many Chevy truck operators are able to get more work done in a day. Make it soon. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

1960 CHEVROLET STURDI-BILT TRUCKS

CHEVROLET

You can save money on line construction with Graybar as your auxiliary warehouse

Use Graybar as your auxiliary warehouse for line construction materials and you make substantial savings of both time and money – in planning, ordering, checking. Save on inventory and transportation costs.

This is because Graybar stocks just about everything needed for line construction, "from the top of the pole – to the bottom of the hole" – and can deliver it all promptly to your central warehouse, substores or work centers.

Another important source of savings – the wide variety of construction tools available from Graybar that help speed the job.

Start with a local call . . . Have your local Graybar man stop in for a discussion.

Employee-owned Graybar has been on the line and part of the local scene for years. Whether you require 3 items or 3,000, Graybar is your centralized source for most electrical utility equipment and supplies.

When Graybar is your auxiliary warehouse —	You save on storeroom costs Reduce inventory investment Insure prompt delivery Step up manhour efficiency Simplify bookkeeping

943

GraybaR

ELECTRIC COMPANY, INC.

420 Lexington Avenue, New York 17, N. Y.

"GraybaR" Everything Electrical "GraybaR" ELECTRIC COMPANY

IN OVER 130 PRINCIPAL CITIES

LOCAL SERVICE TO UTILITIES THROUGH COAST-TO-COAST WAREHOUSING

Introducing . . .

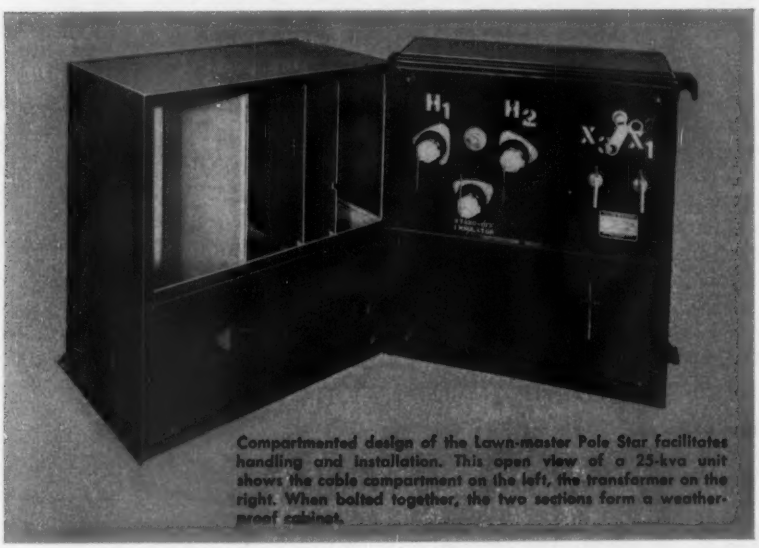
PENNSYLVANIA'S NEW *Lawn-master* POLE STAR

The Surface-mounted Transformer designed with PEOPLE in mind

- **Convenient surface unit for modern, underground distribution systems**
- **Compact, view-enhancing—easy to camouflage with shrubbery, small trees**
- **Easily uprated—each compartment accommodates three different kva ratings**
- **Trouble-free and safe for any location—completely enclosed, with no sharp projections**

Pennsylvania's Lawn-master Pole Star is a transformer designed for "better living" in the fullest possible sense. Specifically intended for use with underground distribution systems, the Lawn-master Pole Star is compact and unobtrusive. Thus, it does not detract from the open vistas created by the elimination of poles and overhead wires.

The Lawn-master Pole Star will provide the continuity of service that homeowners and other power users can expect as a result of underground distribution. All live parts are completely contained in the grounded, weatherproof compartment, thus making the Lawn-master perfectly safe in *any* location, from parking lots to playgrounds. Internally, the Lawn-master features the time-tested Pole Star assembly—with the recently improved "echelon lap" core, which attains new highs in electrical efficiency.



Compartmented design of the Lawn-master Pole Star facilitates handling and installation. This open view of a 25-kva unit shows the cable compartment on the left, the transformer on the right. When bolted together, the two sections form a weatherproof cabinet.

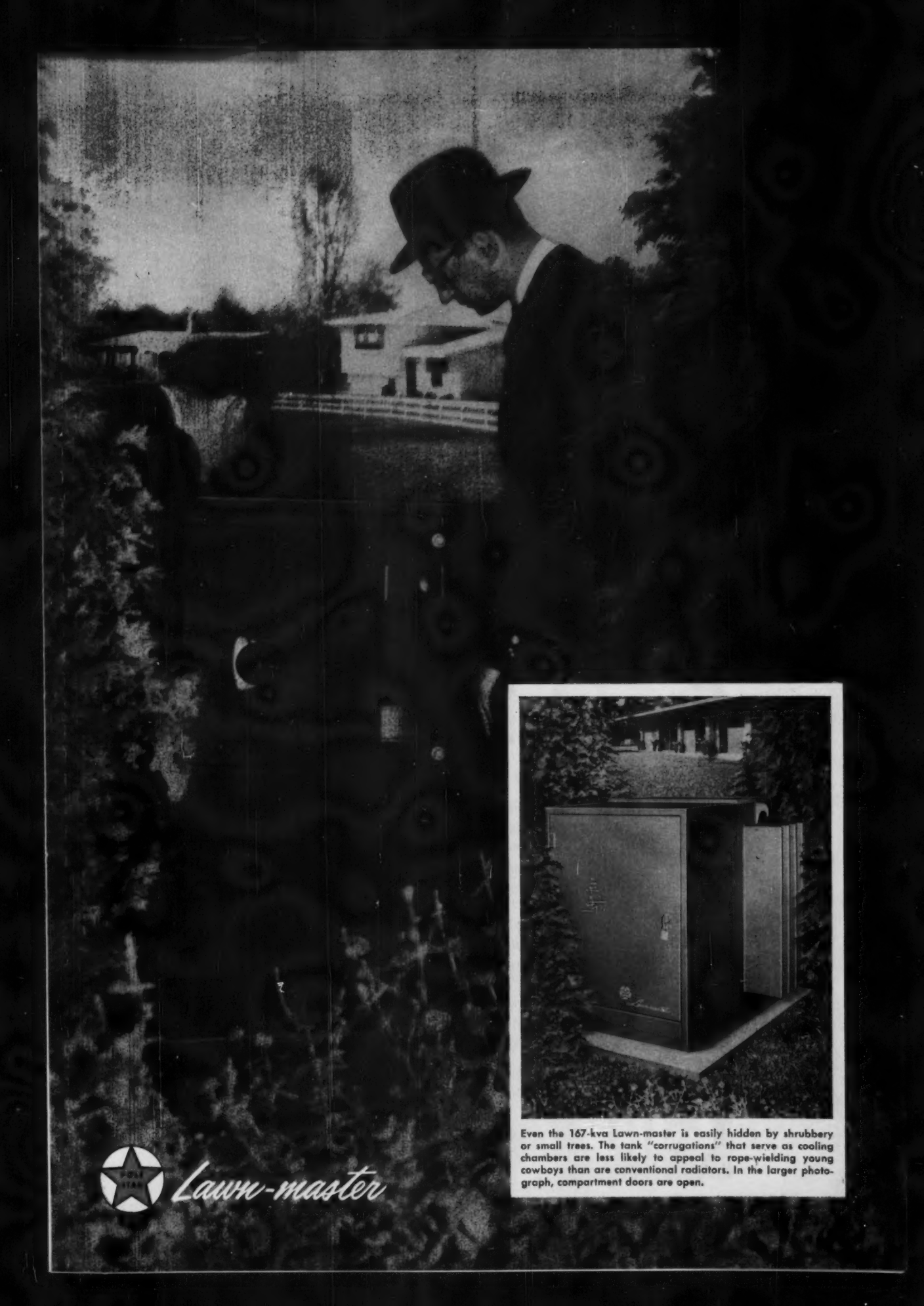
Compartmented design simplifies the handling and installation of Lawn-master Pole Stars. If desired, the cable compartment alone can be installed and then the transformer can be added when service is required. Each compartment accommodates three different kva ratings, so that future expansion is easily accomplished.

Available ratings include all standard sizes from 25 through 167 kva, single phase, and 75 through 500 kva, three phase—15 kv and below. Optional equipment includes transfer switches, standoff insulators and lightning arrester mounting brackets.

For additional information on the Lawn-master Pole Star — the transformer designed with *your customers* in mind—contact Pennsylvania Transformer Division, McGraw-Edison Company, Canonsburg, Pa.

McGRAW-EDISON

PENNSYLVANIA DISTRIBUTION TRANSFORMERS



Even the 167-kva Lawn-master is easily hidden by shrubbery or small trees. The tank "corrugations" that serve as cooling chambers are less likely to appeal to rope-wielding young cowboys than are conventional radiators. In the larger photograph, compartment doors are open.

Lone Star Lawn-master

Good Job, Jenkins!

Now if we could just make it perform like Lapp's...

Lapp Line Posts and Station Posts aren't too hard to copy, we've noticed. In looks, that is. Like most sound designs, they're refined to the ultimate in functional simplicity.

As for performance, maybe that is only a matter of time. In just 30 years Lapp has developed them from original design, through failure-free performance on problem lines and stations, to the stage where many power companies specify them exclusively.

Given the right combination of design engineering, ceramic technology, and day-after-day experience in product refinement and improvement, why, in another 30 years . . .

But *today* is when you could be reducing service interruptions, cutting maintenance and replacement costs, with Lapp Line Posts and Station Posts. Find out now about this better insulator design, from the company that pioneered, proved and perfected it.

Lapp

Write for new Lapp Catalog Eight —tells all about Line Posts and Station Posts. Lapp Insulator Co., Inc., Le Roy, New York.

The Electrical Week

LATE NEWS▶ **Mexican government and American & Foreign Power** seem equally satisfied with terms of sale of AFP's properties in Mexico to the government. Rate increase refusals by the government hit company earnings and Mexico is headed for complete nationalization of electric industry anyway. AFP got $5 million down and $63 million in dollar notes over 15 years at 6½% interest. The $63 million will be reinvested in non-utility enterprises in Mexico under terms of the sale. Mexico assumes liabilities of some $35 million.

Sentencing of companies and individuals who pleaded guilty in the Philadelphia antitrust cases is scheduled for 10:00 a. m., May 18.

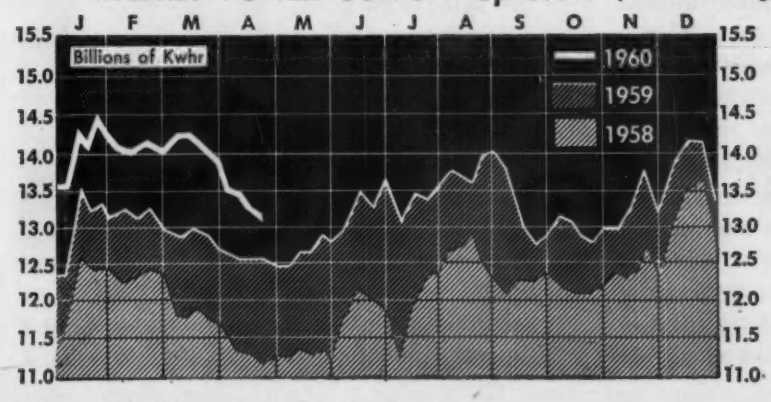
GE Pres Robert Paxton tells stockholders that foreign competition in overseas and U. S. markets is two-sided coin. "If foreign producers are enlarging their shares of the market . . . they are also becoming more affluent and providing richer markets."

Rate increases . . . Washington WP gets PSC okay to up rates $1.6 million a year vs $2,249,000 requested . . . Cincinnati G&E can raise rates by $1,567,000 vs $2,238,000 asked of PUC (see page 79).

Management changes . . . G. F. Switzer becomes vp of engineering and construction, Indianapolis P&L . . . R. M. Hutcheson is vp, Virginia E&P . . . C. T. Abbott becomes vp operations, New England G&E Service, and G. H. Gowdy is chief engineer . . . A. B. Chance elects N. A. Toalson president; L. C. Hansen vp and general manager of the Chance Div; C. C. Hough vp and treasurer; J. M. Arndt vp of industrial and public relations; and J. S. Curtright regional vp . . . A. W. Hoffman becomes vp of purchasing at Brewer-Titchener Corp.

Obituary . . . Davis M. DeBard, 75, former Stone & Webster Service vp and more recently consultant to Reddy Kilowatt, Inc.

WEEKLY POWER OUTPUT—Up 5.4% (Week ending Apr. 23), Kwhr 13,213,000,000



Per Cent Change From Previous Year

	Apr. 9	Apr. 16	Apr. 23
Total U. S.	+ 7.1	+ 5.2	+ 5.4
New Eng.	+ 7.7	+ 5.4	+ 6.6
Mid. Atlan.	+ 8.5	+ 5.1	+ 4.6
Cent. Ind.	+ 7.2	+ 3.8	+ 3.2
West. Cent.	+ 7.2	+ 5.4	+ 3.4
Southeast	+ 6.9	+ 3.6	+ 4.2
South Cent.	+ 5.6	+ 8.8	+ 7.1
Rocky Mount.	+ 7.7	+11.6	+ 9.0
Pacific			
NW	+ 4.1	+ 8.1	+15.2
SW	+ 7.5	+ 5.1	+ 7.0

Seasonally Adjusted Index 267.4

Week Ago 267.3 Year Ago 252.4

Source: Edison Electric Institute

Preview of This Issue

EVENTS ▶ **Outstanding about the four reports** that have been studied by Sen Robert S. Kerr's Water Resources Committee is that they are very different. Submitting reports were the Federal Power Commission, Edison Electric Institute, American Public Power Assn, and Resources for the Future Inc (p 32) . . . Southern California Edison Co announces intent to contract for 360-Mw pressurized water nuclear generating station (p 34) . . . Witnesses at International Joint Commission hearings on Passamaquoddy Tidal Power Project are evenly divided pro and con on its feasibility (p 34).

ENGINEERING ▶ **Helicopter strings 115-kv conductor directly in Puerto Rico.** The island's utility, Puerto Rico Water Resources Authority, saved almost enough to cover the $250,000 price tag on the copters (p 38) . . . Flyash in concrete gives Long Island Lighting economic and lasting paving at new operations center (p 42).

MEETING REPORT ▶ EEI SALES CONFERENCE **Utility men are turning more and more to electric heating,** judging by the tenor of speeches and corridor conversations at the 26th Annual EEI Sales Conference. Water heaters also drew a lot of comment and attention—much of it critical of the industry's performance to date with water heater promotion. Report begins on page 37.

Politics and Public Power

THE NEED FOR A PUBLIC STATEMENT

It now seems quite certain that Federal Power Commissioner William R. Connole is not going to be re-appointed when his term expires next month. What is not so certain is the reason or reasons why he is being "dumped."

Reports circulating in Washington, and widely printed in the nation's press, have it that Connole's stringent attitude toward regulation have antagonized some of the large natural gas producers. And they, in turn, have put pressure on the White House.

The Administration, in handling this matter, has again displayed that inordinate lack of decisiveness for which it has become justly famous—or infamous. For what is plainly needed here is a public statement by responsible White House sources clarifying the matter. It is the very least that Connole, the FPC, and the industries which it regulates deserve. Furthermore, by failing to affirm or deny the reports of Connole's pending demise, it may be sowing the seeds of a political battle it might otherwise avoid.

Consider these circumstances: First, the reports have it that Connole is being pushed out because the natural-gas interests were annoyed by his tough attitude toward regulation on "behalf of consumers." This, of course, is precisely what he's paid to do. Protection of the consumer through regulation is the Federal Power Commission's function under law. If Connole has violated

CONNOLE

SPECIAL REPORT ▶ UTILITY FLEETS **The cover story this week is on utility fleet developments.** Utilities are stocking their fleets with a wider range of vehicles which result in greater productivity and lower operating costs. In automobiles, the trend is to the compact cars; in trucks, it's toward greater mechanization **(p 43).**

PROCUREMENT & ▶ PRODUCTS **Ways of improving purchasing and stores performance** is main theme of 13th annual meeting of EEI Purchasing & Stores Committee meeting in Philadelphia today **(p 60)** . . . Stromberg-Carlson ships transistorized instrumentation and control systems for Enrico Fermi A-plant . . . Line Materials ups ratings on its Issue E Round-Wound distribution transformers rated through 75 kva, 2,400-8,000 v **(p 62)** . . . Combination boom can be mounted on most heavy duty line trucks **(p 72).**

MANAGEMENT ▶ **Will rate hikes be pushed up in '60?** Generally, yes. The rising costs of doing business should shove this year's rate increases, already nudging $30 million, past the $60 million mark by year-end. For a roundup of last year's rate action and a look ahead, see **page 79.**

NEXT WEEK ▶ **Watch for a new approach to utility distribution circuit design.**

FPC or Administration policy, that's one thing. If, however, he is being purged because of natural gas pressure, then the Administration owes everyone concerned a better explanation of its action—or inaction—than it has made so far.

Secondly, it is possible that Connole's views on the need for a national fuels policy have antagonized the gas boys as much or more than those on regulation. He has said, "This country lacks any policy that guides us in the use of . . . energy." Also, "It scarcely seems arguable that a fuel as versatile and so economically suited to high priority uses as natural gas ought not to be substituted for the vastly more abundant and advantageously situated supplies of coal and residual crude (oil) in absence of compelling reasons." He calls for a national fuels policy developed from "an objective group dominated by the federal government, but using the facilities of industry and independent research groups."

If Connole is being "dumped" for these views, the Administration might find itself under political fire from the Democrats during the coming campaign for "selling-out" our national resources.

Finally, there hangs over the entire affair the pall of a Congressional investigation of FPC. And Connole's conduct, along with that of the other commissioners, will be subject to the most searching public scrutiny.

It must pointed out here that the decision to dismiss Connole was taken long before Rep Oren Harris decided to probe FPC. Under no circumstances should any impropriety uncovered by Harris—and there is no evidence at this writing that there has been any impropriety at all—be allowed to be used as the reason for Connole's dismissal.

The Administration can clarify the matter with a statement. It's a fair question to ask why it has not yet been issued.

Nuclear Notes

Dresden Nuclear Power Station, operating at the licensed 90-Mw half power, had delivered 14.2 million kwhr to Commonwealth Edison consumers on April 26.

Peach Bottom, Pa., reactor has gotten over a rough spot in its road to approval. AEC's Advisory Committee on Reactor Safeguards has approved the site on Conowingo Pond, which is the water supply for several communities. Philadelphia Electric, the plant's builder, has satisfied the AEC that the design will avoid hazardous contamination.

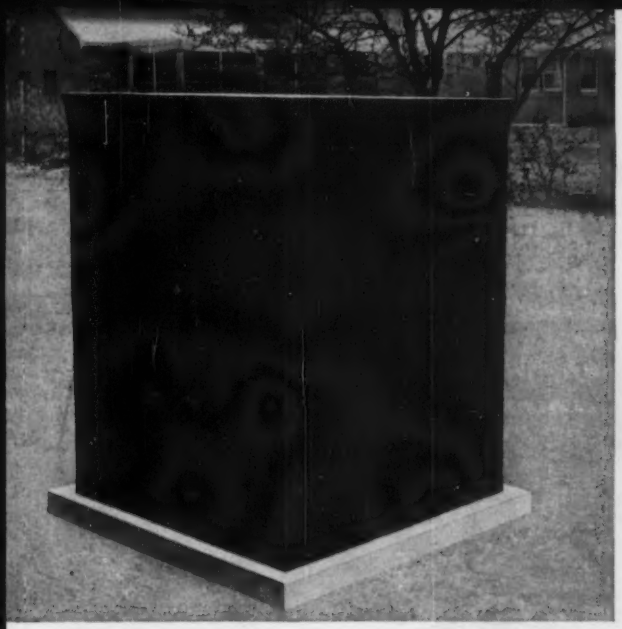
Indemnity regulations covering nuclear accidents have been amended by the AEC. A revised feature has upped the required insurance coverage for smaller reactors. The maximum for plants of 100 Mwt and up, including most utilities' nuclear plants, remains at $60 million, the combined capacities of the NELIA and MAELU insurance syndicates. Presently damage at the reactor site beyond this $60 million might be indemnified out of the AEC's $500 million additional liability. The Commission regards its liability as aimed at covering the general public off the reactor site, and has proposed Congressional amendment to the Price-Anderson Act to eliminate government indemnity of damage to the nuclear facility.

OK for construction of the 17-Mw Parr Shoals plant of Carolinas Virginia Nuclear Power Associates has been given by the AEC. Construction on the pressurized heavy water unit starts this month, with June 1962 as target date for completion.

Series of courses in nuclear technology will be held this summer by the University of California, with the cooperation of the AEC. A one-week survey in July aims at assisting executives in supporting their technical staffs. A two-week course starting June 6 and a following four-week course on radioisotope principles and applications are for technical personnel. Information is available from the Engineering and Sciences Extension, University of California, 2451 Bancroft Way, Berkeley 4, Calif.

Non-destructive testing of reactor materials is the subject of an unclassified AEC symposium for May 20. Purpose is to acquaint industry representatives with the equipment and techniques of this type test, which aims at detecting internal or surface defects of reactor materials. It will be held at the Commission's headquarters in Germantown, Md.

Orientation in nucleonics for teenagers is being promoted by Arizona Public Service Co, member of High Temperature Reactor Development Associates, group building the 40-Mw Peach Bottom, Pa., nuclear plant. This is part of the utility's program to acquaint the people of Arizona with its plans for future power sources and to spark interest and enthusiasm for nuclear energy among high school science students. Outstanding students see developmental experiments and demonstrations of equipment at General Atomic's lab near San Diego, Calif.



THE L-M TRANSCLOSURE is a convenient, economical bridge between overhead and costly conventional underground. The steel enclosure houses L-M distribution transformers and protective equipment; may be ganged if desired. It is well ventilated and safe from intrusion. The unit is compact and inconspicuous, and in neighborhood service, planting conceals it completely.

THE TRANSCLOSURE, assembled at the job site, being mounted on concrete pad. Conduit and cable have already been installed. Enclosure is completely tamperproof. It is fastened to the anchor bolts on the inside. Removable front and back panels have provisions for padlocking. There is ample room for a standard pole-type transformer, cutouts, lightning arrester, pothead and other equipment.

L-M "Transclosure" Puts Transformers Above Ground for Underground Systems

New L-M designed enclosure provides safe, convenient installation of pole-type distribution transformers, reclosers and other protective equipment. Also convenient for load transfer control systems, and other equipment, for new subdivisions, shopping centers, industrial plants, and highway lighting.

By **C. W. PETERSEN,**
Product Manager,
Line Construction Materials
Line Material Industries

Today every utility is faced with the problem of providing underground service safely, conveniently, and at reasonable cost. Line Material engineers have for years been familiar with the many problems of vault construction, and the type of equipment needed for conventional underground construction.

Extremely Flexible Design

One low-cost answer to the problem is the new L-M Transclosure. The Transclosure is a heavy gauge steel cabinet, specially designed to house L-M Round-Wound pole-type distribution transformers and associated equipment. It is shipped, and stocked disassembled; assembled on the job site. Modular construction permits expanding units to provide for any desired space. The cost of intermediate side panels can be eliminated. When load growth necessitates larger transformers, units may also be expanded vertically, by installing larger side panels and bottom vents.

Safe, Well Ventilated; Rainproof

Vents provide ample ventilation, with baffles to prevent penetration by any object. Sloped roof sheds rain. The unit is completely safe. Removable front and back doors with provisions for padlocking, provide complete and easy accessibility to equipment. With special modification meters may also be internally mounted, with glass windows in the door, for meter reading without opening the cabinet or entering the customer's premises. Telephone equipment may *also* be installed in the Transclosure in a separate compartment with separate access door.

Three Sizes Available

The Transclosure is available in three basic sizes to accommodate a range of standard transformers. Roof, base, and door sections are identical for all three sizes and are interchangeable. With packaged "conversion" units of side panels and lower vents, a smaller unit can be changed to a larger unit.

The cost of the Transclosure is moderate—far less than conventional vault construction, and less than most of the makeshift compromises that have been tried. De-rating of L-M Transformers is not required under all except most severe overload conditions.

Will It Meet Your Problem?

The L-M Transclosure has solved a number of different problems; there are probably many applications not yet conceived. Let us submit detailed data. Ask the L-M Field Engineer for suggestions; or write me for bulletins at Line Material Industries, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

LINE MATERIAL® Industries McGRAW-EDISON

McGRAW-EDISON COMPANY

405

Underground Distribution Equipment

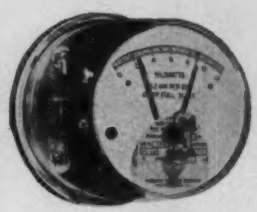
DISTRIBUTION TRANSFORMERS • KYLE RECLOSERS AND OIL SWITCHES • FUSE CUTOUTS AND FUSE LINKS • LIGHTNING ARRESTERS • POWER SWITCHING EQUIPMENT
PACKAGED SUBSTATIONS • CAPACITORS • REGULATORS • OUTDOOR LIGHTING • LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE AND CONDUIT

Why call it "Demand"? Wouldn't you prefer to use one of the terms employed to describe the "demand" function of the Sangamo meters shown here?

Type KVAR for thermal kvar *"requirements"*

Type LA for polyphase thermal kva *"load peak"* and kwh

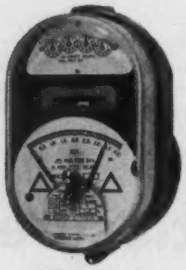
Type J2T for singlephase thermal kw *"use"* and kwh



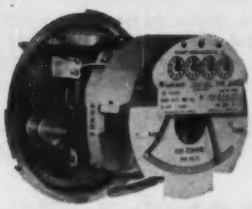
Type WD for thermal kw *"discount value"*

Type PW for polyphase thermal kw *"capacity charge"* and kwh

Type TDT thermal *"load" transmitter* for telemetering



Type LVA for polyphase thermal kva *"capacity"* and kwh



Type J2A for singlephase thermal kva *"load factor"* and kwh

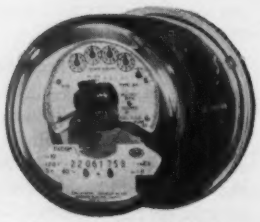
Another Sangamo Electric report on the

Regardless of what you call "Demand" measurement, you can depend on Sangamo Meters to do it better...

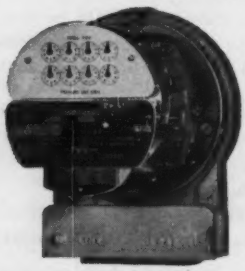
Sangamo offers the most complete line of demand* measuring instruments in the industry... equipment to indicate and record demands from the smallest values to the largest encountered by the electric power industry. The line includes singlephase and polyphase Type D

SANGAMO ELECTRIC

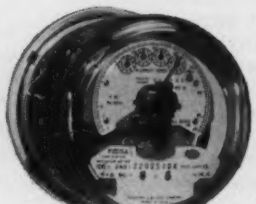
SPRINGFIELD,



Type P4D for polyphase mechanical kvar *"selected service"* and kvar hours

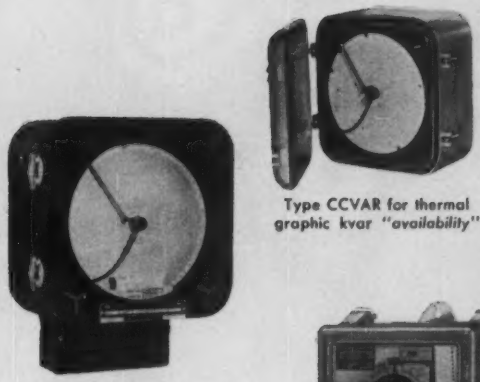


Type JD differential registers for *"energy factor"* billing



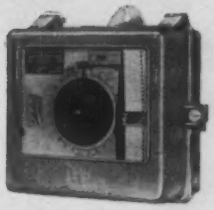
Type P2D for polyphase mechanical kw *"peak use"* and kwh

PH60-1

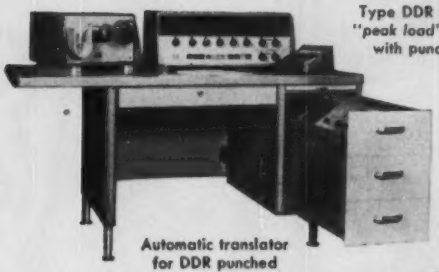


Type CCVAR for thermal graphic kvar *"availability"*

Type CCW for thermal graphic kw *"integrated peak power"*



Type DDR for digital *"peak load"* recording with punched tape



Automatic translator for DDR punched tape

Several months ago, in these pages, we questioned the use of the word "demand" as it is applied to billing. The point was made that it is time for all of us to reconsider our use of the word, and we asked for your opinions and suggestions about what to do with this industry bogey-man.

Your response to our question was immediate. Answers came from all over the country, Canada, and South America. You were practically unanimous in agreeing with us . . . it is time to take the "demand" out of demand metering, and substitute some less offensive and more easily understood term.

Now, we believe that we have received enough suggestions to give us a representative sample of your feelings, likes and dislikes. We've counted and catalogued these suggestions (note: the most popular terms have been used in the product captions) and have listed the three that were mentioned most often on the ballot you see below. (We've also left space for a write-in vote if you would like to suggest still another term.) Won't you cast a vote for the term you think would do the best job of solving this thorny public relations problem, and mail it to the address shown on the ballot?

use of the word 'Demand' in metering

mechanical demand registers, Lincoln indicating and graphic demand meters, digital demand recorders and translating systems for Kw, Kvar, and Kva demand. You'll do well to look to Sangamo first for all types of demand measurement instruments.

*Until your vote is cast, and you've selected a new term.

COMPANY
ILLINOIS

Type J2D for singlephase mechanical kw *"power supply"* and kwh

Type P3D for three stator polyphase mechanical kw *"service capacity"* and kwh

BALLOT

Let's take the "demand" out of demand metering. Vote for the term you feel best describes this phase of metering. Check your choice.

☐ Capacity ☐ Load
☐ Load Peak ☐ _____

Name_____
Position_____
Company_____
Address_____
City & State_____

Clip and mail to:

SANGAMO ELECTRIC COMPANY
MARKET RESEARCH DEPARTMENT
SPRINGFIELD, ILLINOIS

Blaze a smaller path!

Running a power line through a dense tree area can be a costly job!

With open-wire systems, the path you clear must be a broad one. Otherwise extra-long poles are necessary. Either way costs you plenty.

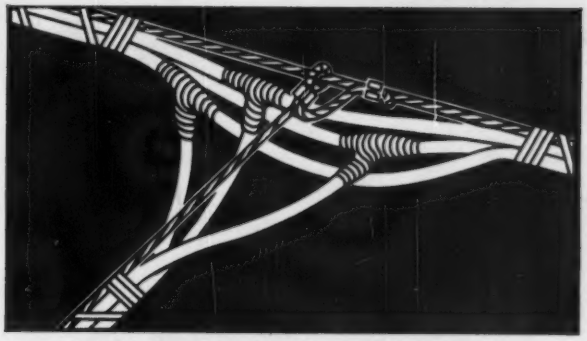
With Rome's reverse-lay preassembled aerial power cable, less tree clearance is required, so you do less tree trimming—initially *and* periodically. Rome aerial cable has a built-in, high-strength messenger for staunch support—capable of supporting falling branches and even trees.

For instance—you need not clear as much of a right of way *initially* as you would for open-wire systems. And you can put off *periodic* tree trimming for as long as five years, compared to the normal two-year requirement for open-wire systems.

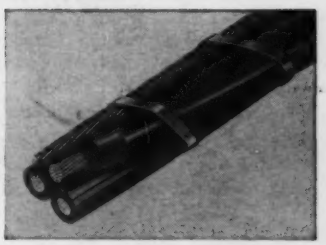
Because each conductor is fully insulated and jacketed for maximum resistance to moisture and tree abrasion, reverse-lay aerial cable reduces the chance of outages during storms and high winds. There's no chance that wet branches will cause shorting between phases. And it's safer for your line crews to handle during storms . . . safer for the public too!

In residential areas, preassembled aerial cable gives you two *more* advantages. You avoid situations in which the public might feel you are "defacing" property by excessive tree trimming. And, because it's compact, aerial cable makes a neat, uncluttered appearance—less likely to bring complaints.

You can get Rome's preassembled reverse-lay aerial power cable in a wide range of constructions, rated up to 15 KV: Rozone (oil-base) or Rozone A (butyl-base) insulation, Roprene (polychloroprene) or Roseal (flame-retardant polyethylene) jacketing. Mail the coupon, now!



EASE OF TAPPING Long spans sometimes make mid-span tapping necessary. Rome's reverse-lay preassembled aerial cable construction—where the direction of lay of conductors is reversed at regular intervals along the line—permits easy mid-span tapping. The reversed portions provide sufficient "slack" for taps *anywhere* along the line! This eliminates the necessity of making taps at the pole ends only. Stress is carried entirely on the messenger. Conductors can be untwisted for tapping without cutting—even while the line is hot! Your linemen can use wire guards and rubber blankets for safety and make pole-end taps without use of a platform.



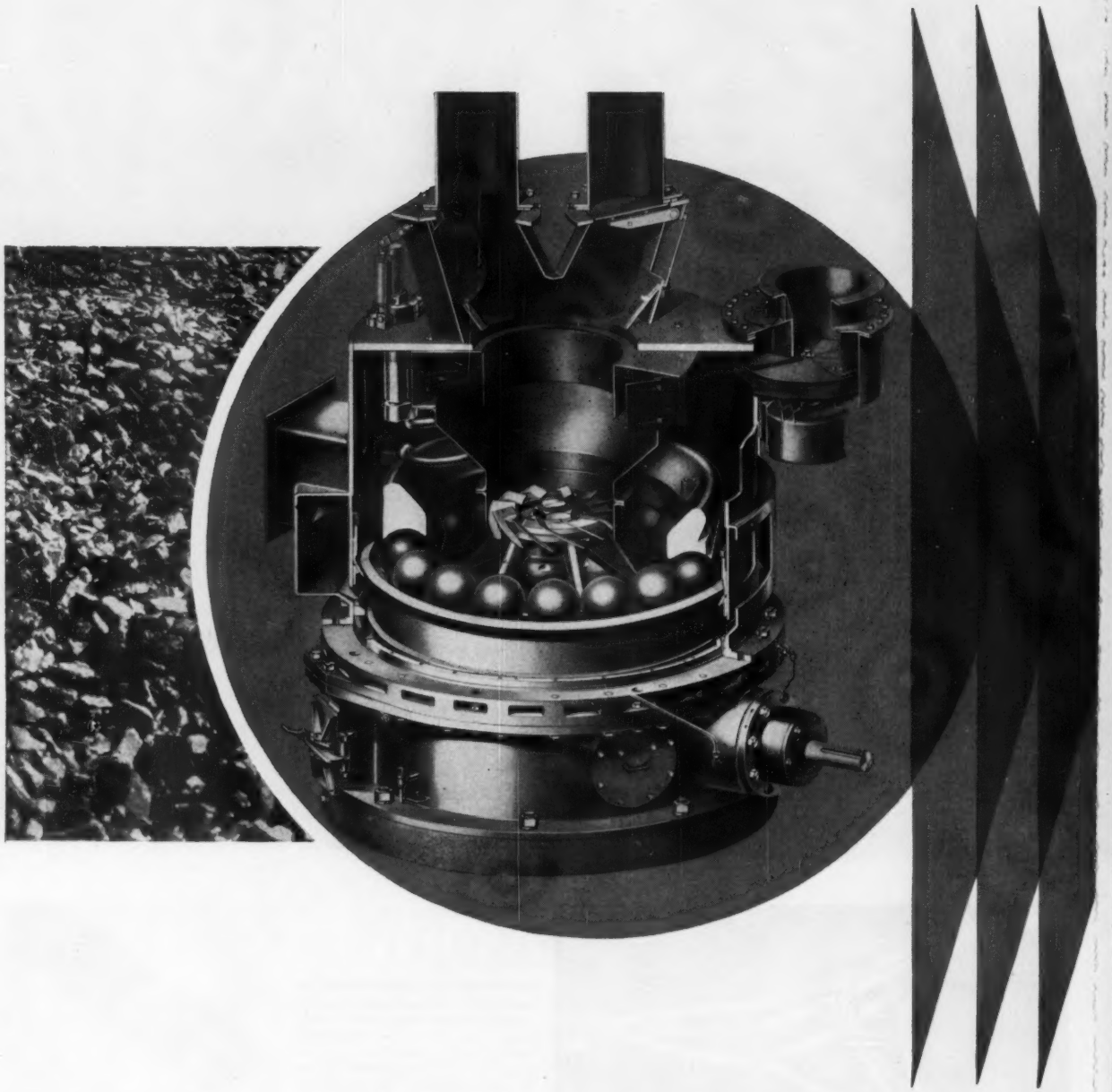
BETTER VOLTAGE REGULATION Because of its close geometric spacing as compared with open-wire circuits, aerial cable has a lower reactance. Voltage drop is about half as great as typical crossarm construction and, for a given voltage drop, power can be transmitted twice as far.

ROME CABLE
DIVISION OF **ALCOA**
Department 1-50, Rome, N. Y.

☐ Please send me more information on the above.

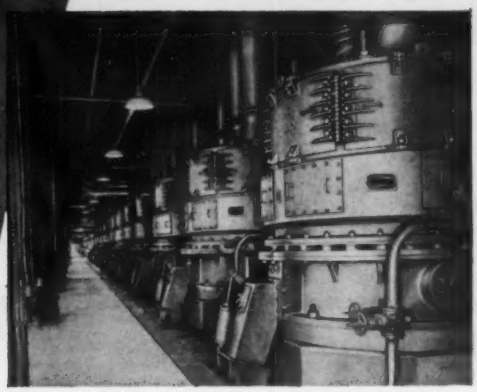
Name .....
Title .....
Company .....
Street .....
City ..... Zone ..... State .....

ALCOA
ROME CABLE
DIVISION



Design Simplicity Cuts Pulverizer Maintenance

B&W offers a compact, Space-saving Unit for Efficient Grinding



Proved in hundreds of installations: B&W Pulverizers produce exceptional output records, year after year. B&W engineering combines high efficiency with unusual compactness and ease of maintenance. For example . . .

Simple, Accessible Arrangement makes routine maintenance easy, quick and safe. Adjustments can be made readily, without shutting down the unit. Fan maintenance is minimized, because the B&W Pulverizer uses *only clean primary air,* supplied under pressure. This means simpler, more economical fuel piping, too. And, no special distributing devices are needed . . . the pulverizer acts as its own distributor.

Delivers Uniform High Fineness, consistently, over its entire service life. Only material of the proper fineness can leave the B&W Pulverizer, because its high circulating load promotes efficient and dependable product classification. Proper grinding contact is maintained by spring-loaded ball bearing grinding elements, operating at a slow speed. Special-alloy grinding components will last two years or more on eastern coals and at least one year on midwestern coals.

No Trouble with Low Grade or Wet Coal, because the B&W Pulverizer *recirculates* the fuel through heated air, and regrinds oversize particles. This unique feature — exclusive with B&W—assures maximum utilization of even lowest-grade coals, whether too dry or soaking wet. It eliminates capacity losses, shutdowns or special attention.

Takes All Types of Automatic Controls. The B&W Pulverizer features "one point contact with the boiler" . . . an uncomplicated arrangement by which the boiler's automatic combustion control regulates the pulverizer by adjusting only the damper in the primary-air duct. The pulverizer's own control system regulates all other functions, including fuel-air ratio and operating temperature.

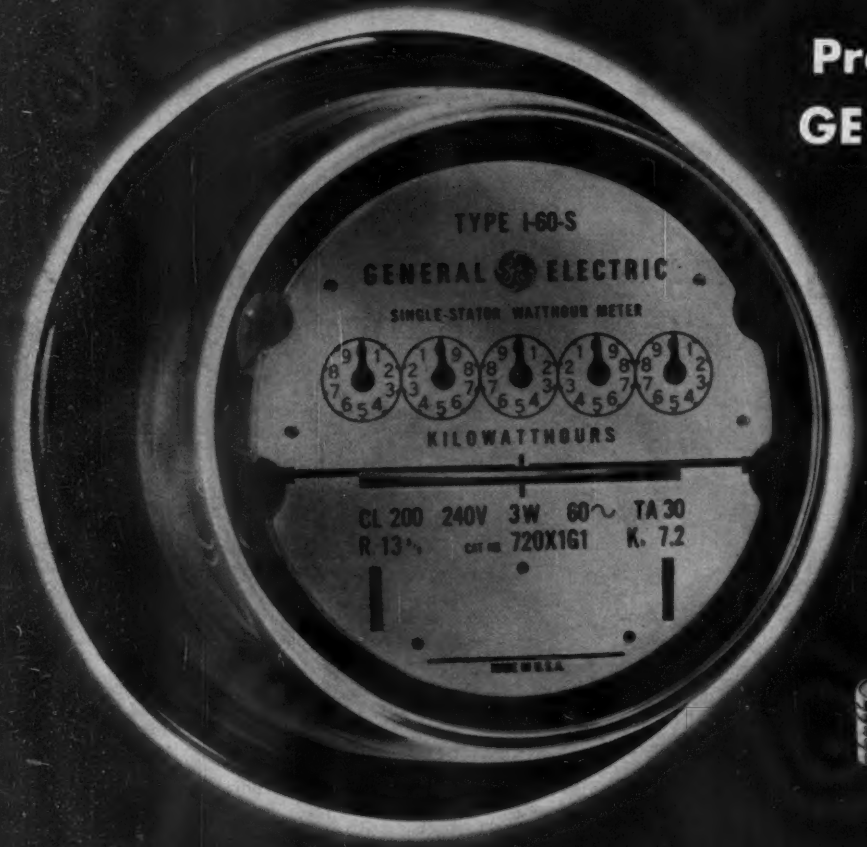
To Get Full Information about the advantages of the B&W Pulverizer and Pulverized-Fuel Firing Systems, write today to The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

B&W

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

G-958



Present Worth of GE I-60 Magnetic Purchased

Today's purchase of each General Electric I-60 meter provides . . .

Up to $9.13 in EXTRA VALUE because

Each General Electric single-phase meter with magnetic suspension put in service today can save you up to $9.13 in present worth, $27.19 in gross revenue loss over 30 years . . . here's proof:

Assume an average kw-hr usage per consumer based on extrapolations of Electrical World forecasts per year for 30 years and the percent loss of registration for each of the 30 years (see graph at right for magnetic suspension vs. ball-bearing meters). Result: total loss for each ball-bearing meter would be 1141.3 kw-hrs *more* than for G-E's magnetic suspension meter. With an average cost of $.02382 per kw-hr in revenue loss, this means a gross total revenue loss of $27.19. At six percent annual interest, the "present worth" of the extra value (resulting from greater sustained accuracy) on every magnetic suspension I-60 meter purchased today is up to $9.13 . . . vital proof that, in metering, it pays to buy the BEST.

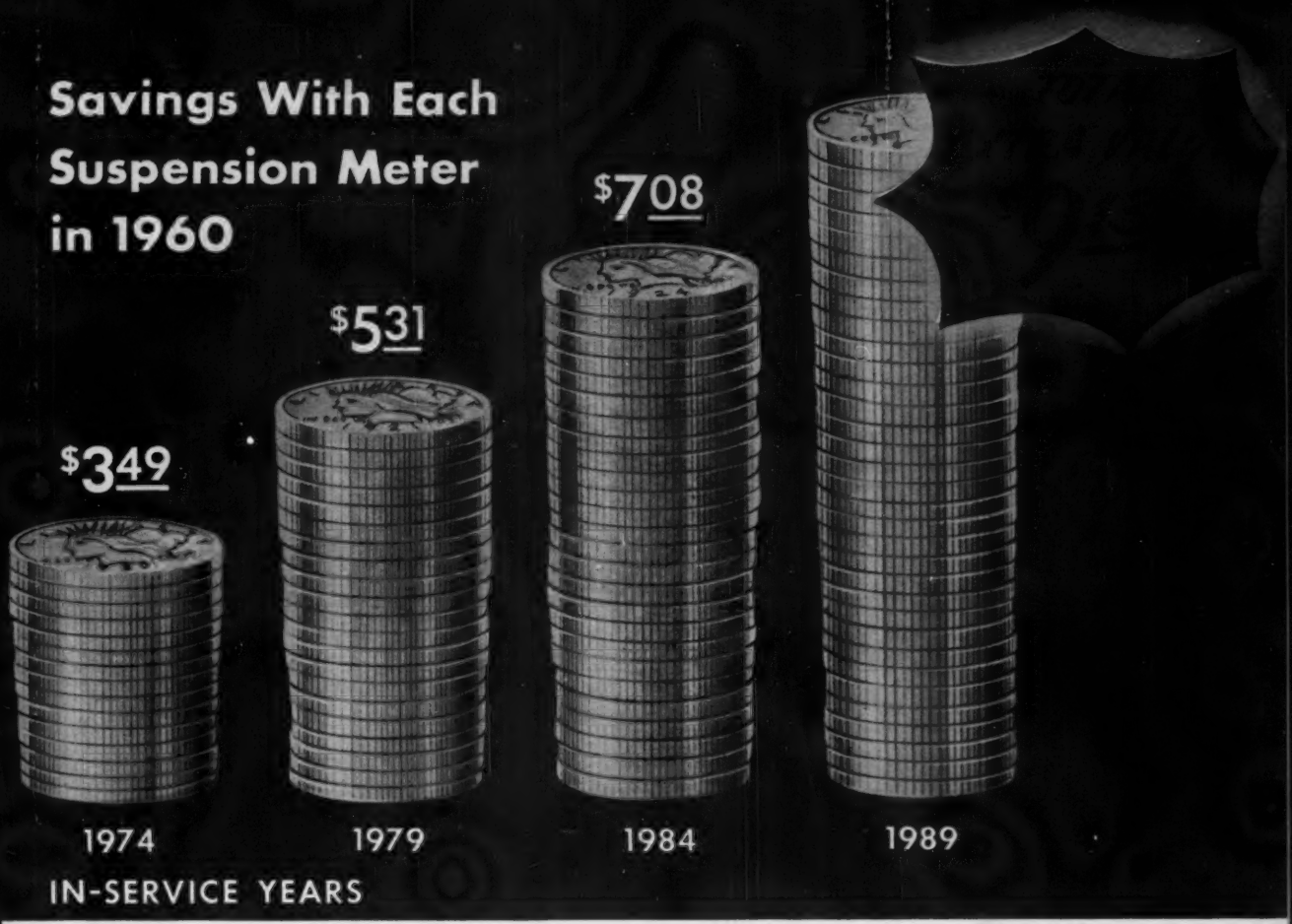
Like more information? Contact your General Electric Apparatus Salesman. Or, write General Electric Co., Somersworth, New Hampshire. 713-01

SERVING MEDALLION HOMES EQUIPPED BY GENERAL ELECTRIC

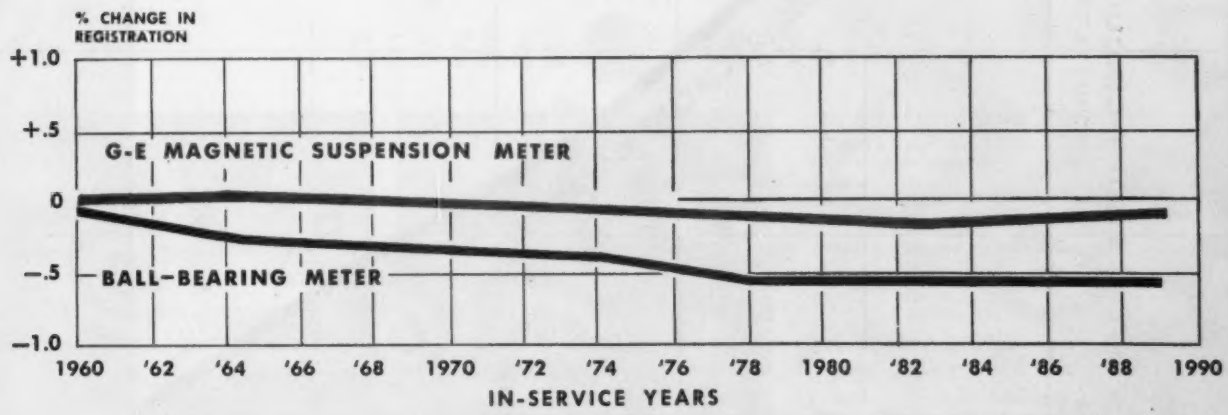
MEDALLION HOME LIVE BETTER ELECTRICALLY

In metering, anything less than the best is too costly.

Savings With Each Suspension Meter in 1960



# of Greater Sustained Accuracy

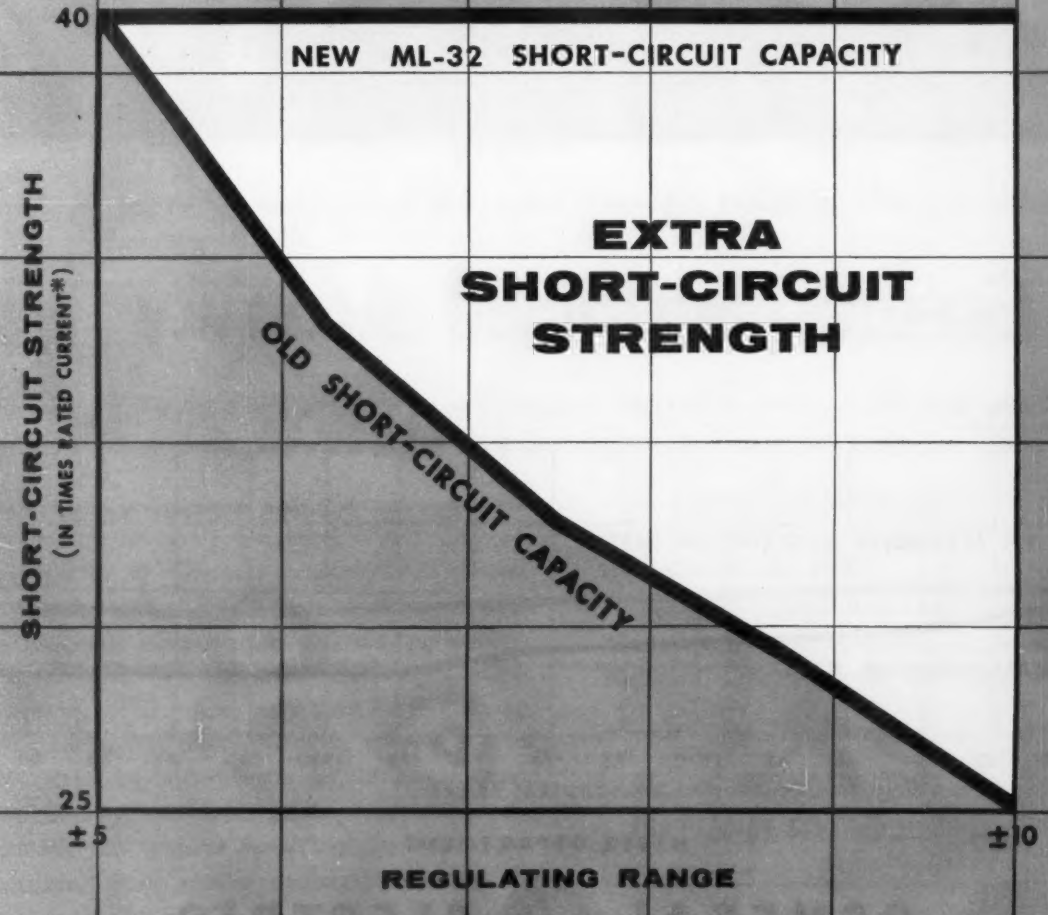


METER DEPARTMENT

GENERAL ELECTRIC

NOW STANDARD ON ALL GENERAL ELECTRIC

40 times rated current* short-



* Rated current is the nameplate current at ±10% regulation.

SINGLE-PHASE STEP VOLTAGE REGULATORS

circuit strength

New, stronger coil windings of General Electric single-phase ML-32 step voltage regulators will now withstand short-circuit currents of 40-times basic nameplate rating (the basic current rating at ±10% regulation) at all Load Bonus positions.

This increased short-circuit capacity is available for a duration of 0.8 seconds (48 cycles). With modern breakers, this time period gives ample leeway to detect a fault and de-energize the circuit.

Additional strength to resist high-current forces means increased protection against service outage under all current loads, plus even longer dependable life for already superior General Electric voltage regulators. Both of these important benefits are now available in G-E regulators at no increase in price.

These service extras are now possible because of the following G-E design improvements:

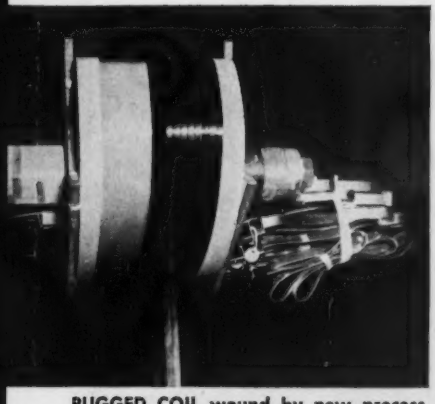
- **TIGHTER WINDINGS**—new coil winding process provides tighter, even coils; inherently stronger, better able to resist coil movement caused by short-circuit stresses.
- **SPECIAL INSULATION**—specially treated layer insulation forms a stronger winding-to-winding bond for finished coil. Additional protection added at points of most-severe stress to further resist coil shifting.
- **CONTROLLED DUCT SPACING**—cooling duct spacers are accurately positioned to hold windings firmly in place against radial forces during short circuits.
- **BALANCED WINDINGS**—coils are precisely aligned to resist destructive forces caused by short circuits.

This new high standard for voltage regulators is another dividend you receive from G-E research.

To learn more about all the reasons why G-E Voltage Regulators Cost Less on the Line, contact your nearby General Electric Apparatus Sales Office or Agent. Or write for Bulletin GED-3905, General Electric Company, Section 423-41, Schenectady 5, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC



RUGGED COIL wound by new process provides stronger resistance to forces caused by high short-circuit current.

SPECIAL INSULATION strengthens coil by stronger winding-to-winding bond, resists movement caused by short-circuit currents.

EXTRA REGULATOR STRENGTH

(for a typical ML-32 100-ampere unit)

Regulating Range	Current Range	Former Short-circuit Capacity	NEW Short-circuit Capacity
±10%	100 amp (normal)	2500 amp	4000 amp
±8¾%	110 amp (load bonus)	2750 amp	4000 amp
±7½%	120 amp (load bonus)	3000 amp	4000 amp
±6¼%	135 amp (load bonus)	3375 amp	4000 amp
±5%	160 amp (load bonus)	4000 amp	4000 amp

HOW SOUTHERN STATES' BV-33-F CUTOUT CLEARS RESTRICTED OR HIGH FAULTS WITH EQUAL DEPENDABILITY

The complexities of today's distribution systems present a real challenge to the designers of cutouts. Industry requirements call for interrupting capacities up to three times higher than a few years ago. And yet the cutout must clear restricted faults with equal ease and sureness.

Large bore tubes, vented freely at both ends, will clear extremely high faults easily. Small bore tubes, vented at one end, will clear low faults easily. The big problem is to do both.

The Southern States BV-33-F Heavy Duty Cutout clears the complete range of fault currents with equal dependability—without damage to the cutout.

What About Single-Venting?

In single vented cutouts, the rocket effect of the tube, as gases are ejected, must be considered. Some type of shock absorber to cushion the fuse holder, as it tends to thrust upward, must be provided. But so far no practical recoil mechanism has been devised that can fully absorb the violent recoil action. Thus a substantial amount of shock is transmitted to the mounting, insulator, bracket, and cross arm.

As interrupting capacities on single-vented cutouts are increased, bore diameters become critical. If it is large enough to handle high faults, it may provide only borderline protection on restricted faults. Resorting to some extraneous means, such as special types of fuse links, is a dangerous concession to security—as there is no assurance of proper fusing in the field.

What About Controlled Venting?

Providing a small vent hole in the top hardware to permit a limited amount of gas to escape is not the solution either. This practice was dropped by Southern States long ago, when it was found that the hole became enlarged after each operation, endangering proper clearance of low faults.

Here's the Answer

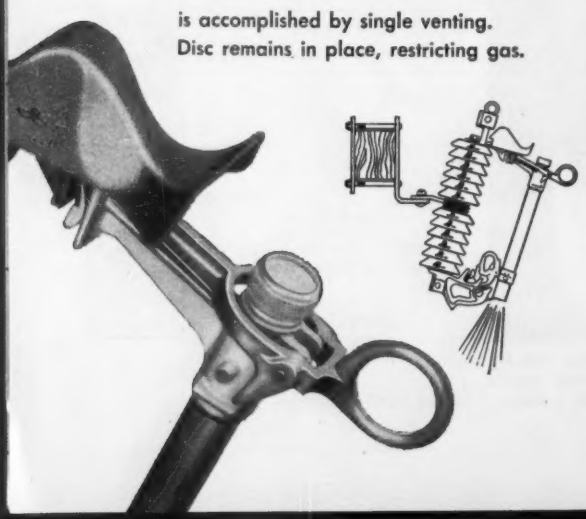
The BV-33-F offers all of the advantages and none of the disadvantages of single-venting or controlled-venting. This is accomplished with an economical expendable cap which confines gases on restricted faults, but allows them to double vent on high faults. Forces inside the tube are equal and opposite. Stress on the mounting is virtually eliminated. The cutout can operate time and time again without loss of efficiency. There is no built-in battering ram—no intricate mechanism, or springs to worry about. And any standard EEI-NEMA fuse link will provide positive operation every time.

Utilities throughout the nation are finding the BV-33-F a practical, workable solution to cutout problems.

Get complete information from your Southern States representative, or write for Bulletin 580C.

LOW FAULT CLEARANCE

is accomplished by single venting.
Disc remains in place, restricting gas.



HIGH FAULT CLEARANCE

is accomplished by double venting,
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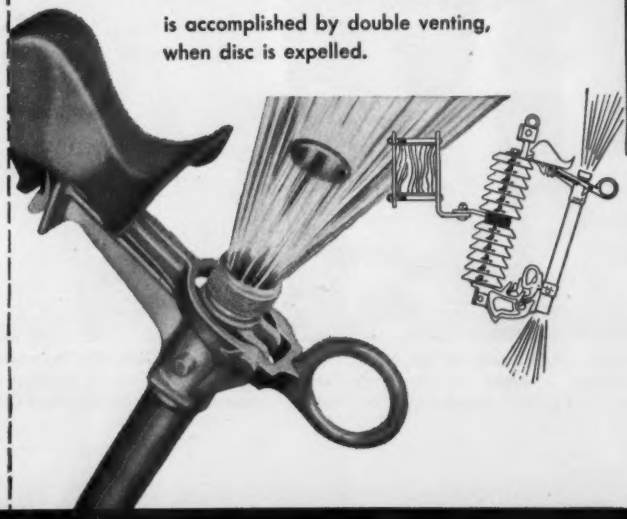

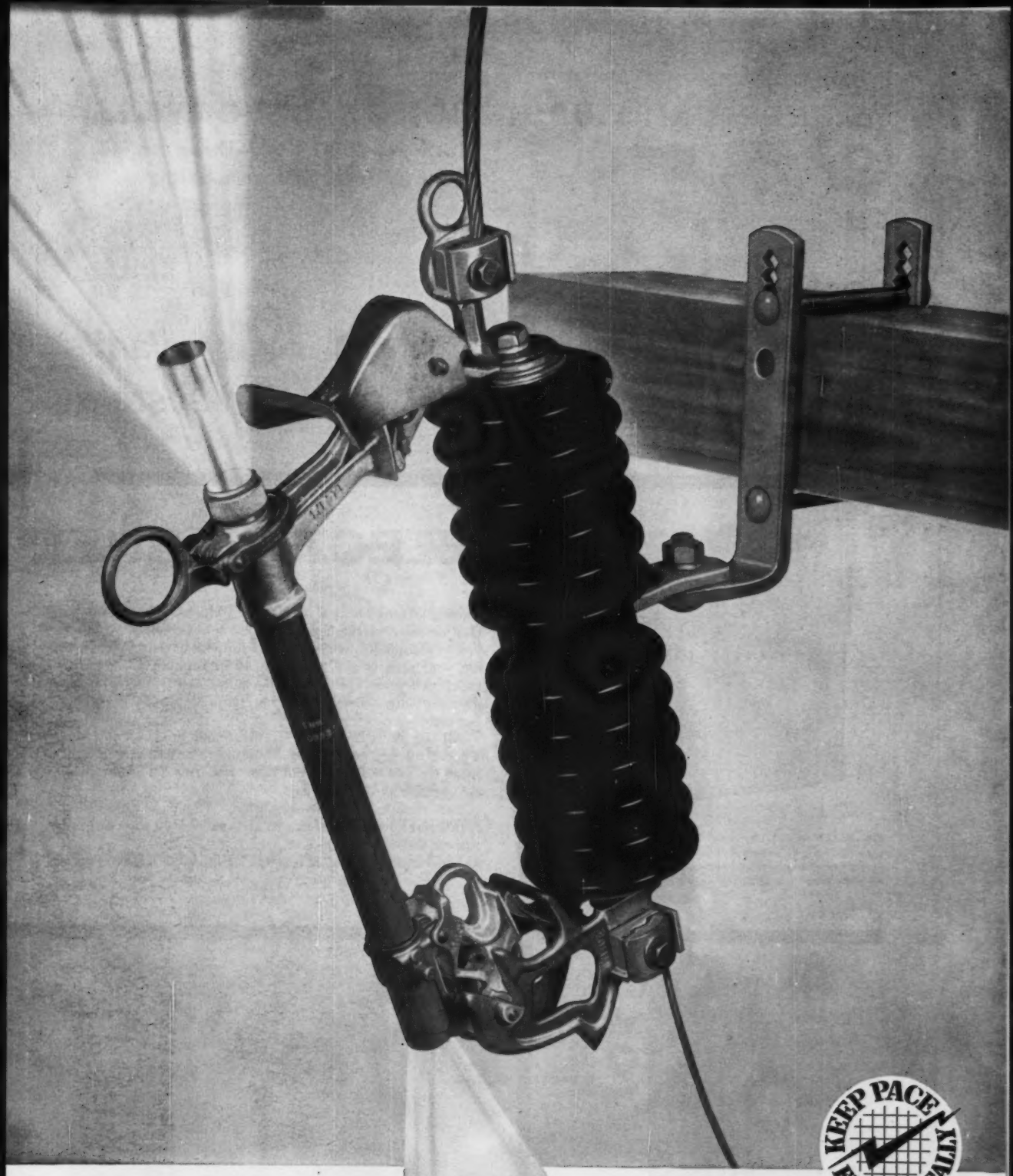

KEEP PACE ELECTRICALLY

SS

SOUTHERN STATES EQUIPMENT CORP.

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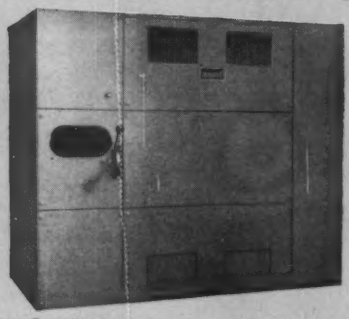
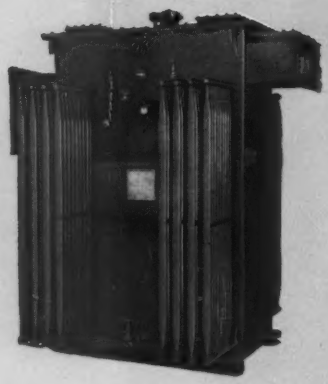
112½ to 2000 Kva—three phase, 60 cycles, 15 KV and below



VENTILATED DRY-TYPE—For indoor installation in reasonably dry, dust-free, well ventilated locations. Light in weight, ideal for multi-story buildings. No fireproof vaults required. Insulated for 80°C temperature rise.

for your plant's electrical system...



OIL-FILLED—Generally installed outdoors. Can be used indoors in fireproof vaults. Outdoor transformers can be connected to indoor switchgear using weather-proof bus-duct. 55°C rise, self-cooled or forced-air cooled.

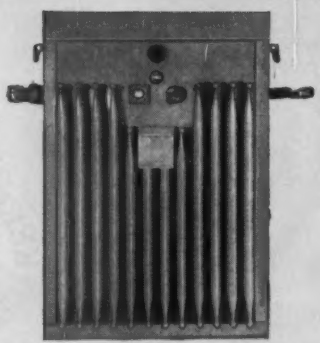
SELECT WAGNER

There's a complete line of Wagner Industrial Transformers. One or more of them will fit your specific needs whether you're planning a new plant distribution system, modernizing your present one, or adding to its capacity to meet increasing demands for power. So, select and specify Wagner Transformers. They'll give you long, dependable service because:

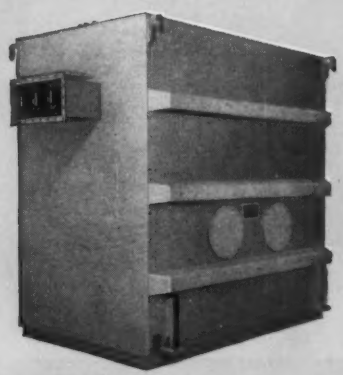
All Wagner Industrial Transformers are liberally designed, sturdily constructed, thoroughly tested, and able to meet the heaviest industrial demands. You get continuous, dependable power for years.

For your main plant substation, Wagner Liquid-Filled Industrial Power Transformers are available in standardized ratings through 10,000 Kva.

Load centers? Wagner makes PREDESIGNED Unit Sub-

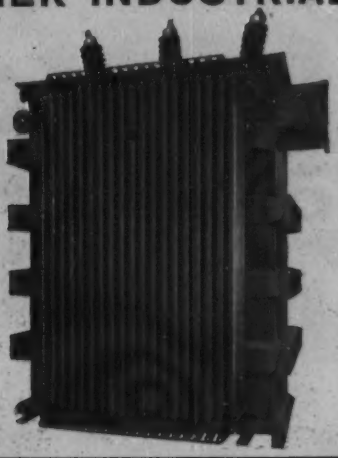


NOFLAMOL—Non-inflammable liquid-filled. For indoor or outdoor installation, especially suited for chemical plants, refineries and similar locations where explosive liquids or gases are present. The close-coupled design fits flush against switchgear enclosures to save space. Throat connected designs are also available. 55°C rise, self-cooled or forced-air cooled.



SEALED DRY-TYPE—Hermetically sealed in welded steel cases to provide positive protection from contamination, fire and explosion hazards. Sealed tank is filled with inert nitrogen. Only maintenance needed is periodic checking of gas pressure. Can be safely installed in any load center.

WAGNER INDUSTRIAL POWER TRANSFORMERS



Oil-filled, for outdoor installations, available through 10,000 Kva, 67 KV and below.

Noflamol, non-inflammable liquid-filled for explosive atmospheres, available through 7,500 Kva, 15 KV and below.

The performance stability of Wagner Industrial Power Transformers is outstanding. Quality is designed and built into these transformers by specialists with years of transformer engineering and production experience. Highest quality materials... carefully controlled production methods... constant inspections and tests make sure these transformers give in-service performance that means better service for your system.

INDUSTRIAL TRANSFORMERS

station Transformers to meet your particular requirements. Furnished with suitable incoming line sections, these transformers will save you time and job engineering costs. And, you can specify the secondary switchgear you prefer.

Wagner Dry-Type Distribution Transformers are an economical choice for plant areas requiring 120/240 volts, single-phase or 208Y/120 volts three-phase.

Over 65 years of constant research and development has made Wagner a leader in transformer design . . . made the name Wagner one of the foremost in power planning. For expert advice on your present and future plant transformer needs, call or write the Wagner branch near you.

get economical, dependable, power packages!

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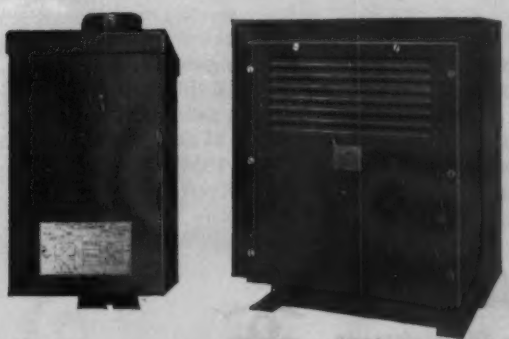
WAGNER DRY-TYPE DISTRIBUTION TRANSFORMERS



Single-phase 1 to 100 Kva—Three-phase 3 to 300 Kva—600 volts and below.

These dry-type distribution transformers have a low sound level, are compact and light in weight. They meet all safety requirements for indoor installation. They are economical to maintain... have no liquids, valves, gaskets or gauges.

Type AE, single-phase, 1 through 50 Kva, and Type AP, three-phase, 3 through 30 Kva, can be installed indoors or out. Larger ratings for indoor installations only. Ratings through 10 Kva single-phase are filled with an epoxy compound... operate quiet as a whisper... perfect for areas where noise would be a nuisance. They, and three-phase units through 30 Kva are designed for wall mounting... other ratings for floor or platform mountings.

Available for high voltages of 120 x 240, 240 x 480, 480 and 600 volts to 120/240 volts single-phase, and 480 and 600 volts to 208Y/120 volts three-phase.

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W760-3

Meet me in St. Louis . . .

Foresight founded St. Louis, Missouri, as a French fur-trading post in 1764, and helped it grow to the nation's eighth largest city . . . to become a manufacturing center for 3,300 different products while remaining the nation's largest raw fur market.

Foresight on the part of local electric utilities and 18 trunk line railroads has supplied this city's commerce, homes and industry with power and transportation to keep St. Louis growing.

Foresight has enabled Kerite Cable to serve the past and present needs of power, railroad and other industries with a high standard of dependability—a standard maintained since 1854. ***And when tomorrow's problems occur, Kerite will already be ahead of them.***

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The Antitrust Cases: 2–

Judgments Will Call for Insight

In last week's editorial comment, we sought to set the electrical equipment antitrust suits in perspective. We observed that two matters are far more significant in the long run than any utility reactions to the suits. These are: The overall effect of finally-rendered court judgments; and the future attitude toward all aspects of competition by buyer and seller.

At this stage, several guilty pleas are entered, but numerous innocent pleas are not yet brought to trial. Several more grand juries are investigating additional product lines. Thus we must re-affirm our intent not to pre-judge yet unproved cases against individual corporations and specific individuals.

Yet, there will be court judgments rendered, and whatever they may be, they will affect traditional buyer-seller relationships. In fact, as the trials are awaited, these relationships already are in a state of flux.

At best, the final judgments can serve to put some of the industry's pricing policies on a sounder basis, thus making a constructive contribution to the public interest. At worst, they can stifle rather than enhance competition, leaving confusion and uncertainty, and crippling valuable industry programs.

Looking beyond the trials and verdicts, we urge that the most searching consideration be given by the courts to the actual consequences of the judgments. Only thus can the purpose behind the antitrust statutes be well served.

In the broad interests of utilities and their customers, as well as in those of the manufacturers, we respectfully offer the following specific suggestions. Actually, they should be self-evident. But we feel they are so vital that we advance them in attempt to enhance insight into a sophisticated situation.

Therefore we urge that:

• Final judgments should strengthen competition, rather than weaken it, if the industry is to continue to make its vital contribution to the economy. It is possible for punitive measures to reach beyond the defendants to injure their customers and the general public. For instance, any judgment that so impairs a firm as to run it out of business by default or merger could lessen the actual competition within the industry.

• Final judgments should encourage sound and reasonable pricing policies. They should discourage cut-throat pricing, which in the long run would retard technical advances and thus work to the detriment of the ultimate consumer. For example, a judgment could be drawn which would create an atmosphere which foments price instability and sets the stage for price wars which benefit no one.

• Final judgments should encourage continued free flow of non-pricing information, to permit extension of the powerful cost control leverage of product standardization and cooperative technical programs. It is quite possible that vaguely-worded judgments will be interpreted by faint hearts in the industry to mean requiring the lowering of a curtain blocking normal and vital business intercourse.

But the court decisions and judgments can do no more than create the atmosphere for sound pricing policies. It is the joint responsibility of buyer and seller to formulate the policies and put them into effect. It is to these responsibilities that the final editorial comment in this series will be dedicated.

Wide Spread Revealed in FPC-EEI

Still other differences of opinion show up in American Public Power Assn and Resources for the Future reports

Government and utility industry experts foresee a tripling or quadrupling of U.S. electric power requirements in the next 20 years. In separate forecasts the Edison Electric Institute projects nearly a four-fold increase for 1980, while the traditionally cautious Federal Power Commission estimates a three-fold growth.

Sen Robert S. Kerr's Select Committee on National Water Resources issued the two contrasting forecasts in Committee Print No. 10. This document includes also independent reports on the electric power outlook from the American Public Power Assn and Resources for the Future, Inc, along with an estimate of anticipated co-op growth from the Rural Electrification Administration. APPA foresees even faster increase of power requirements than EEI, while the RFF report invisions greater development of hydro potential than FPC anticipates.

FPC and EEI estimates of total U.S. requirements in 1980 point up the historical shortcomings of forecasts by the government agency. The APPA report gives a lot of space to criticism of underestimates by FPC in past forecasts. It advises the Senate committee, in effect, to place no reliance on FPC projections. For itself, APPA estimates a growth rate of 10% a year can reasonably be anticipated.

Divergent views of FPC and the utility industry on future growth go deeper than the figures in the table. On electric energy requirements, the committee asked the groups consulted to extend their estimates to the year 2000, on both a national and per capita basis.

Here the FPC and EEI take markedly different approaches. The FPC shows total energy requirements rising from 728 billion kwhr in 1958 to 2.2 trillion in 1980 and 4.5 trillion in the year 2000. EEI sees total output going up much more rapidly to 2.9 trillion kwhr in 1980 and to some figure between 6 trillion and 10 trillion by the end of the century, depending on growth rates both for the national economy and for new uses of energy, especially electric space heating.

Translating these totals into per capita output involves another complication. The FPC adopted the highest population projection of the Census Bureau and extended it to the year 2000, for estimates of 273 million in 1980 and 425 million at the end of the century. EEI used lower estimates, 245 million in 1980 and 340 million in the year 2000.

Per capita output under FPC's system would be only 7,927 kwhr in 1980 and 10,496 two decades later. The Institute's larger total output and fewer people would produce 11,797 kwhr per capita in 1980 and between 17,600 and 29,400 in the potential range posted for the turn of the century.

Both the FPC and the EEI look for big steam-electric additions to take care of most of the capacity increases anticipated. For hydro, the FPC feels that its data are sufficiently complete to substantiate its figure on future hydroelectric capacity (a 34,580-Mw increase by 1980). But Resources for the Future, in a chapter by Bruce C. Netschert, questions the adequacy of U.S. data on hydro potential and notes that improved technology can enlarge the opportunity for hydroelectric installations. Hydro additions by private utilities will be mostly pumped storage projects, the EEI report says.

FPC explains that its figures for future steam plants were derived by first estimating hydroelectric and internal combustion capacity and then subtracting these from total needs. Its resulting breakdown by type appears in the table.

By 1980, FPC expects public and private utility systems to own more than 93% of total generating capacity, as compared with less than 89% today. The proportion of non-utility capacity will decline during that time, the agency figures.

For the public and private utilities as a whole, FPC forecasts 421 million kw of generating capacity in 1980, up from 143 million in 1958.

Energy Demands and Capacity Requirements

(in thousands of Mw)

	Total U. S.		Private and Public Utilities	
	FPC	EEI	FPC	EEI
Peak Load				
1959	134*	145	120*	129
1970	—	283	—	265
1980	389	521	366	501
Capability				
1959	161*	183	143*	165
1970	—	326	—	305
1980	451	599	421	576

* As of the end of 1958

Two Forecasts on Power Sources

(in Mw)

EEI—For Private Utility Companies

	1959	1970	1980
Conventional Thermal	111,757	225,417	416,782
Nuclear Thermal	65	7,719	38,900
Hydro	12,486	20,003	24,926
Other sources**	3,019	9,784	11,779

** Firm capability available from other than investor-owned systems and from non-federal facilities, plus adjustments arising from inter-regional transfers.

FPC—Total U. S. Capacity

	1958	1980
Steam†	127,076	378,700
Hydro	30,042	64,622
Internal Combustion	4,116	7,900

† No breakdown for nuclear

Power Need Forecasts

This utility system capacity, as the agency sees it, will include nearly 64 million kw of hydro (up from 29.3), 352 million of steam (up from 111), and 5 million of internal combustion (up from 2.8).

Forecasts of both FPC and EEI fall short of growth possibilities envisioned by the public power group. APPA in its report suggests an annual average growth of nearly 10% for electricity generation. Such a rate of increase would double energy output in eight years and triple it in 12 years.

In support of the high growth rate projected, APPA cites the 12-year record, 1946-58, of electricity generation. As reported in EEI industry statistics, output rose from 223 billion kwhr to 645 billion kwhr in this time span.

Annual Growth of 10% Seen

On this basis, APPA argues that it seems reasonable to project an annual average growth rate of about 10%. At this rate of future growth, it points out, total utility generation of more than 5.2 trillion kwhr is projected for 1980, far in excess of the 2 to 3 trillion foreseen by FPC and EEI.

FPC projects a tripling of energy requirements not in 12 years but in 22, from 1958 to 1980. The Institute foresees a bigger future, but one more in line with U.S. experience since 1935, which the public power group notes has produced a six-fold increase in electricity generation, more than doubling every 10 years.

By an odd paradox, however, the EEI report conditions its projections on continuation of the high postwar growth rate for (GNP) Gross National Product (3.57% a year), rather than on the 50-year average rate of 3%. The Institute successfully correlates long-term estimates of kwhr sales with the trend of GNP. For the two decades ahead, sales estimates compiled by the utility industry mesh best with the postwar growth rate of the national economy, and this rate was adopted as a corollary of the projections.

The public power group, however, has little use for GNP as an indicator of utility requirements. Since 1945, APPA says, the relationship between GNP and power generation has become less than real, with the power curve climbing briskly while GNP goes along at a much lower level.

APPA also takes its traditional stand as a proponent of hydro power. It finds FPC estimates of future hydro additions too low, in the light of increasing hydro potential that becomes available and economical to develop as technology is improved and more intensively applied.

The Resources for the Future section of the Committee document arrives at similar conclusions on hydro power in a detailed study of the possibilities. Balancing all factors, this chapter concludes that the U. S. will have an installed hydro capacity of 60 million kw by 1975. This implies a considerably higher installed capacity by 1980 than the FPC has projected.

"To put it in terms of possibilities," the RFF report says, "available data suggest that the hydro resources of this country that can be economically developed at present are perhaps on the order of four times the current level of development."

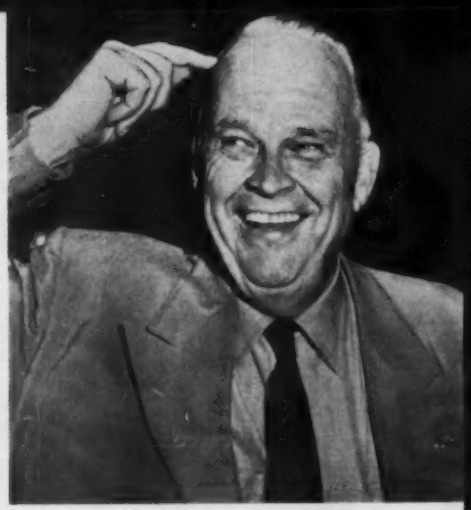
In other words, the study indicates some 120 million kw of available hydro sites that could be developed. FPC estimates 24% development of available sites, with 30 million kw of installed capacity and 90 million kw of undeveloped.

EW Figures in Report

The APPA feels that the *Electrical World* estimate of last September projecting a growth rate overall of about 8% a year comes closer to meeting the future need than does the new FPC report to Sen Kerr.

"In terms of capacity requirements, measured in kilowatts, *Electrical World* suggests a 1975 figure of 479 million kw," APPA says, "The 6.5% annual rate would mean 438.4 million kw; and the FPC predicts 376.2 million kilowatts by that date."

The RFF chapter added a possible 10 million kw of capacity by 1975 in pumped storage stations. It notes that the pumped storage technique "enhances the already growing value of hydro as peak capacity and gives promise, with the reversible pump-turbine, of leading to the widespread installation of hydro capacity employing this technique."



CONFLICTING VIEWS given to Kerr

The 10 million additional kw for pumped storage represents the maximum that the report expects from adoption of the technique.

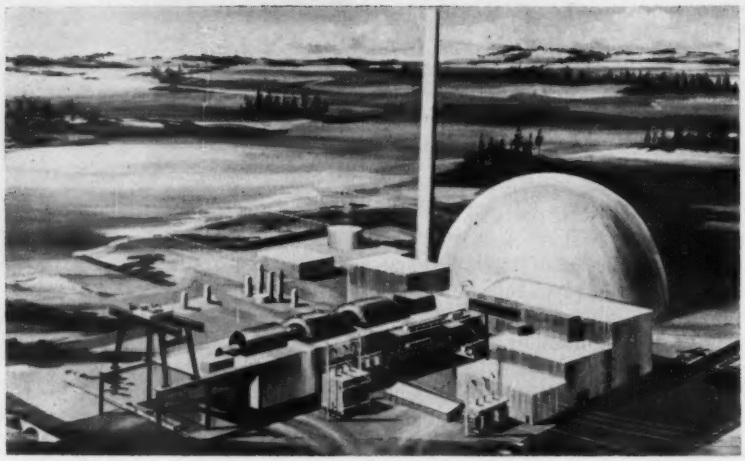
EEI also says that "increased use of pumped storage hydro is expected."

Sen Kerr, in his letter to the committee members, said that the Department of Agriculture in 1958 estimated the installed capacity financed by the REA was 1,195,485 kw, which supplied 15% of the total energy requirements of the agency's borrowers.

"Using this same percentage," Kerr said, "REA estimates that installed capacity in its borrower-owned generating plants will be 6 million kw by 1980.

He pointed out, also, that the EEI chapter shows that 131 private companies are participating in study, design, construction and operation of nuclear power plant having an ultimate capacity of 1.4 million kw. "Projections to 1980," he said, "indicate the possibility that about 39 million kw of nuclear capability will be serving private systems."

The studies on electric requirements and capabilities are part of Sen Kerr's year-long inquiry into the nation's water needs and supply. He has held hearings in various parts of the country, and has had study reports made on many problems relating to national water resources.



WATER CIRCULATES under 2,000 psi pressure to pick up heat from fuel elements

Big A-Plant for California

Announcement by Southern California Edison Co that it has started negotiations for a 360-Mw pressurized water fueled generating station was termed a "breakthrough" by AEC Chairman John McCone.

The announcement bears out statements in the Atomic Energy Commission Ten Year Program that capital costs of large pressurized water and boiling water reactors are low enough now for economical production of power over the life of the plant in areas with high fuel costs, and with fuel guarantees by core element manufacturers.

Two other major projects being considered are by New England Electric System and Pacific Gas & Electric Co. NEES has not selected a reactor type, but PG&E is studying a proposal to build a 300 Mw or larger type, according to Edison Electric Institute testimony at the 202 hearings in February.

McCone, who has been a supporter of both the SCE and PG&E projects, said:

"The commission will give this project every possible support and cooperation. I feel that this breakthrough will lead to similar decisions by other utilities in the U.S. where conventional fuel costs are creeping up due to scarcity and inflation."

Harold Quinton, board chairman of SCE, announced last Monday that he has written a letter of intent to Westinghouse Electric Corp and Bechtel Corp to negotiate contracts. Westinghouse would supply all nuclear components and Bechtel would be the engineering constructor. The plant will cost about $70 million.

TVA Published Booklet On Bond Financing

In anticipation of its first revenue bond issue, probably coming out sometime before summer, the Tennessee Valley Authority has published a booklet entitled, "Basic Data on TVA and Its Revenue Bond Financing."

Besides general background information on the Authority, its history and operations, the booklet outlines the amendment to the TVA Act of 1933, passed in August of 1959, authorizing the issuance of bonds.

The amount outstanding on the bonds at any one time is limited to $750 million. Other features emphasized are:

- Principal and interest will be payable solely from TVA's net power proceeds (earnings plus depreciation). The bonds will not be U.S. government obligations.
- Debt service will have first claim on net power proceeds.
- Principle and interest will be exempt from state and local taxes, except for estate, inheritance and gift taxes. However, the interest will be subject to federal income taxation.
- Bonds will be lawful investments for all fiduciary, trust and public funds under U.S. government jurisdiction.
- National banks are permitted to underwrite or purchase the bonds for their own accounts. This is the first time since the Banking Act of 1933 that such banks are authorized to do this.

Lehman Brothers, a New York investment firm, has been named financial adviser to TVA on the bond issue.

Witnesses at IJC Hearing Divided on 'Quoddy Feasibility

"My company spends between $300,000 and $400,000 a year for electric power, so if anyone has an interest in cheap power, I do. From a power standpoint, Passamaquoddy doesn't make sense. If you want to build a $687-million tourist attraction, that's something else again." These are the words of John R. Newell, president of Bath Iron Works in Bath, Me., and member of an impartial committee of Maine engineers studying the Passamaquoddy Tidal Power Project. They were spoken at a public hearing held by the International Joint Commission in Calais last week.

Although the committee of which Newell is a member voted thumbs down on 'Quoddy, the Maine Governor's Committee and a host of local groups voiced enthusiasm for it.

The Electric Council of New England, in a special study by the consulting firm of Charles T. Main, Inc, of Boston, opposed the tidal project on the basis of its high cost.

About 30 witnesses appeared before the IJC, and were about evenly divided, for and against the project.

Partnership Lauded at Arizona Conference

PLEASANT SURROUNDINGS of Chandler, Ariz., provide the backdrop for a meeting of executives attending the Southwestern Electrical Conference. From the left are W. G. Scholl, Allis-Chalmers; Philip Sporn, American Electric Power Co; A. L. Burke, Duff & Phelps, and Balfour S. Jeffrey, Kansas Power & Light Co

The "triple-partnership team"—private power, non-federal public power, and federal power—working under a "tried and true philosophy that that government is best that is kept closest to the people," received full credit for the power industry's amazing job of expansion, in a manner sanctioned by the President of the United States.

The scene was Chandler, Ariz. The occasion: The Annual Meeting of the Southwestern Electric Conference, a conclave of private utility executives from Arizona, Texas, Oklahoma, Kansas, Missouri and Iowa.

In a frankly partisan speech, Bryce N. Harlow, deputy assistant to the president, scored the "devout disciples of federalism," those "officious arrogants who would federally superimpose upon a state or a region utility developments offensive to the citizens concerned.

"It is at the very heart of our federal concept that states and local communities shall have full authority to determine for themselves whether their utilities should be publicly or privately owned and operated. The advocates of each system are at the very least ardent, but I must say that those who insist upon no public power at all are as unrealistic as those who cry out for federal power and federal dams or no power and no dams at all," Harlow told the audience.

And why does the Administration hold to this philosophy? "I will give just one of the many pragmatic reasons: it works."

But "a new assault on team work is lurking menacingly in the wings," Harlow warned, "an objective we thought we had left behind—that of dominating America's electric power industry . . . is being brought back to life by those who would have federal control of a federally planned, federally financed, federal supervolt integrated transmission system," Harlow said.

And what can be done about these menacing machinations? "To me it seems in order for today's producers, transmitters and distributors of electric energy to reassess the strides made over the past 80 years, analyze the requirement of today, determine what is needed for tomorrow and then move heaven and earth to insure that the needed steps are taken in a thoroughly responsible way."

Competition Stimulates Research

In this conference, as at other recent ones, the subject of electrical industry research and development was brought to the center of stage. Electrical manufacturers are spending from 5 to 7¢ of the sales dollar on research and product development, Allis-Chalmers' Executive Vice President W. G. Scholl reported. Scholl said the five largest electrical equipment manufacturers, "all fierce competitors," are spending about $420-million annually among them, assuming the average spent by the group is 6% of sales.

Turning to the currently provocative question of the best way to conduct R & D in the electrical industry, Scholl remarked that "some feel that perhaps a given amount of money should be pooled and spent under the combined direction of an industry group or even an agency of the government. Well, that certainly is one way of conducting a research program—but a dangerous one!" Such a single agency program, Scholl insisted, would, by eliminating competition, result in a slowing down of product development and efficiency. "I believe research is inseparable from manufacturing engineering," Scholl emphasized. "They go together, and I believe this is the best assurance of continued progress toward economical service and a stable investment atmosphere."

The research theme was carried forward by American Electric Power Co's president, Philip Sporn, who

noted that never before has there been such ferment and opportunities in the field of technological developments as at present. Since electrical generation still uses the original processes some 80 years old, this is most especially true for the field of electric energy production, Sporn said. "In fact," he continued, "the development of magneto hydrodynamics, the fuel cell, thermoelectric converters and thermyonic converters would," in his opinion, "prove possibly more significant in the next century than did the discovery of the control of nuclear fission."

Of these four, Sporn rated magneto hydrodynamics the most promising, although the technological problems are formidable.

Turning to the question of whether total energy sources would be adequate for the future economic growth of the nation, Sporn was adamant that there is "no basis for apprehension." He qualified this with the proviso that there would be proper management and operation of our economic system to provide for more vigorous expanded fuel supply. Sporn made it obvious that the electrical industry would become even more important in the total energy picture as time went on, noting that only 9½% of total expended energy was consumed in the form of electricity in 1920 and that this had risen to almost 20% of the total by 1959. His prediction was that the rise would continue to about 26% by 1975 and 40% by the year 2000.

Is it unreasonable for an investor to ask that the utility industry be consistent in the use of accelerated depreciation accounting methods? A. L. Burke, executive vice president of Duff & Phelps, Inc, thought not. When per share earnings in balance sheets are inconsistently stated, "I think (this) is being unfair to the investors whom you all look to to supply your new capital." In fairness, he continued, the industry and the regulatory bodies should get together and solve this problem.

Of course it is quite possible, Burke quipped, that this problem will be solved by Congressional repeal of the IRS Section which authorizes accelerated depreciation, in so far as it pertains to the utility industry.

Foreign Free Enterprise Battered

The mounting intensity of the offensive against private enterprise in Latin America must be listed as the "over-riding economic problem in some of the key countries" there, the group was told by H. W. Balgooyen, American & Foreign Power Co's executive vice president. Of almost equal importance, in Balgooyen's view, and closely allied to what he termed an "international Communist conspiracy," is the widespread problem of Latin American inflation. "Still, I am an optimist by nature and by inclination and, certainly, I have faith in Latin America's long-term future," Balgooyen said. However, he painted a picture of difficulties in operating an electric power enterprise with investments in eleven Latin American countries—and problems in most of them. He struck out at "A government . . . whose every official act seems deliberately calculated to frighten away foreign investors and foreign visitors." But he also struck out at primary causes of misunderstanding between good neighbors based on the reciprocal lack of knowledge and information of each concerning the other. On the Latin American side, he attributed much of this to education deficiencies, but charged there is less excuse for our similar lack of understanding.

There are many wonderful opportunities to exploit good service in customer relations through various media, the utility executives were told by Davenport Morning Democrat Publisher H. B. Hook. He held up as an example the foresightedness of Iowa Utilities in stressing pooling facilities and anti-outage precaution in reminding customers how unusual weather extremes have affected their bills and in many other ways. Hook was happy to learn of utility programs of practical political action education. He termed it a simple, but long-term thing, and a very important part of public relations.

Survey Shows Business Growth in Industry

Evidence of why conversation about electrical industry research and development programs has been on the increase lately is found in a report just completed by the McGraw-Hill Economics Department. The electrical machinery industry is planning to spend a whopping $92 million on R&D in 1960, placing it in the top three of the nation.

The survey shows that electric and natural gas utilities are going to come close to their 1957 expenditures for expansion with $6.2 billion this year. Increasing power needs will keep electrical utility spending at a high rate throughout 1961-63.

Manufacturers of nonferrous metals indicate they will spend $369 million this year and maintain about the same level over the next three years.

New Business from Expansions

The entire electrical industry can look forward to new business from industrial expansion and modernization through 1963. Plans are for spending some $37.9 billion in 1960 by businesses of all categories. Manufacturing industries will be spending about two-thirds of their improvement budgets on modernization, which is approximately $10 billion.

Another encouraging guideline for the electrical industry is that of all capital expenditures in all business, 30% will be for buildings and 70% will be for machinery and other equipment. In manufacturing industries alone the difference is even greater with a ratio of 20 to 80. Only the commercial sector (chain stores, hotels, office buildings, etc.) will spend the lion's share on buildings.

More Information on May 16

A more detailed analysis of the report will be carried in *Electrical World's* "Management Newsletter" in the May 16 issue.

EEI Sales Meeting Focuses On Heating

LBE PROGRAM display board brought conferees up-to-date on program's progress and future plans. Stream-lined program is set for 1961

Twenty-sixth sales conference shows more interest in future of electric heating and water heater problems

Electric heating is coming into focus in the eyes of utility men all over the country. Skeptics before, converts now, are more and more the case.

This was never more clearly demonstrated than at the Edison Electric Institute 26th Annual Sales Conference at Chicago's Edgewater Beach Hotel April 4 to 6.

One other fact also stood out. Something must be done about electric water heaters. Gas sales are up; electric are down. Marketing problems are just not being solved.

Probably no speaker hammered these things home more sharply than Georgia Power Co's Vice President C. M. Wallace who said, "Utilities cannot double residential use per customer in the next 10 years unless they capture the heating market—including electric water heating, electric ranges, electric clothes dryers, and electric space heating.

"The key to the solution is the total electric home, including electric heating and air conditioning."

Dollars and cents-wise this would be worth about 23,000 kwhr per year to the electric utility (based on a $20,000 home in the 3,000 degree-day area), Wallace pointed out. This compares with 1,500 kwhr for an all-gas home, which would bring in $49.68 per year. The all-electric would get $375.00 per year, he said.

"The water heater picture is not good," Wallace said in delving into that market. "In 1949, from a ratio of one electric water heater to two gas, we have reached the unenviable position of one electric to four gas in 1959. In terms of gross revenue, if we had been able to maintain the ratio of one electric to two gas, the electric utilities, had they secured their share of the business, could have added 2,875,000 electric hot water heaters," he said. Over a 10-yr period this represents a loss of over 56 billion kwhr, or $703 million dollars in revenue, he pointed out.

Residential Sales Increase Small

Other things disturbing to Wallace:

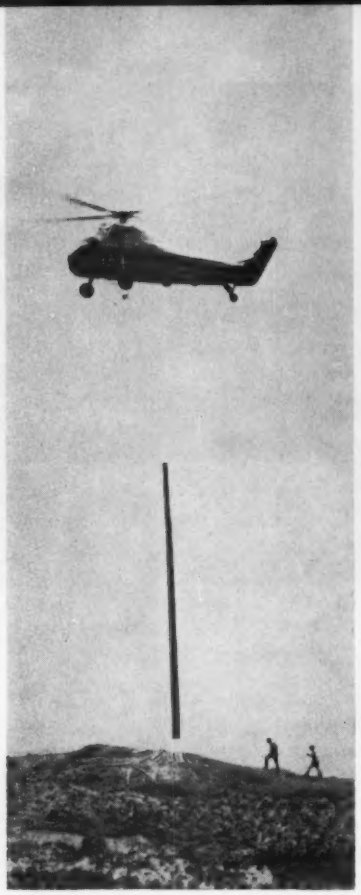
- Residential sales showed the smallest percentage increase in 1959 over the previous year of any market. Instead of an increase of 330 kwhr per year needed to reach 1969 goals, the industry only recorded 184 kwhr. "Unless we step up our activities this industry will not achieve its objective goal of 7,000 kwhr per customer. We will have to show an average increase of 345 kwhr per customer per year . . ." he pointed out.
- Little or nothing is said about the commercial aspects of load building. Industrial growth means commercial growth also, and the new factories will be followed by new stores, motels, office buildings, supermarkets, schools and shopping centers. "Are these new commercial establishments going to be designed and constructed to make full use of electric service and to permit future growth, or are they going to be lost to the competition and out of date in a few years?" he asked.

Wallace's talk was part of a wrap-up of the all-electric concept as viewed from various sources. The role of the architect and how he can help sell this concept was brought forward by Richard W. Quinn, a student architect from the University of Notre Dame. No stranger to utility mores (his dad is Quentin Q. Quinn of Connecticut Light and Power Co), Quinn said that electric heating was by far the most prominent topic in a series of interviews he had with architects while on a CL&P summer training program.

Stressing the point of need for a special rate for electric heating, he said that any negative reaction he found was under old rates before the utility instituted a special rate.

A number of architects also showed interest in the possible use of electric heat in schools and for commercial and industrial use, he noted.

(*Continued on page* 94)



CARGO AIRLIFT speeds wire stringing. Helicopter pinpoints drum of wire at unreeling site. It also delivers whole construction crews with equipment

SETTING 65-FT POLES by air became big dollar saver in the first year on Puerto Rico

Puerto Rico

'Copter directly strings conductor for 115 kv; savings first year nearly cover the $1¼-million purchase price

JOSEPH R. RAUB, Helicopter Section Supervisor, Puerto Rico Water Resources Authority, San Juan, Puerto Rico

Use of the helicopter has solved the problem of building transmission lines over mountainous terrain and through areas of tropical growth for the Puerto Rico Water Resources Authority. Its use has facilitated rapid expansion of the Authority's power system to meet Puerto Rico's recent industrial growth at a substantial reduction in construction time and costs.

These unique features have marked the Authority's use of the helicopter in 115-kv transmission construction to date:

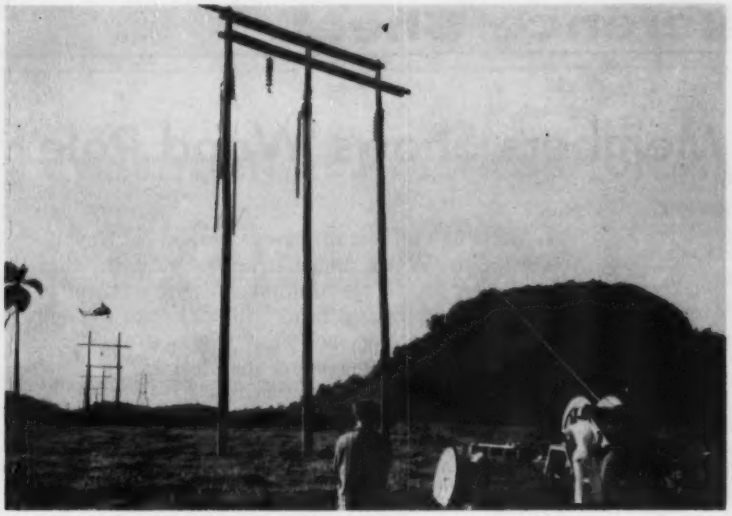
- Direct stringing of conductor for the first time anywhere
- Airlift of materials and spotting of crossarms and hardware at construction sites
- Transport of crews
- Setting of transmission poles up to 65 ft
- Organization of its transmission construction and procedures around the helicopter

Although an initial period of experiment in early 1959 resulted in costs of about $100,000 above conventional methods, operations based upon the helicopter during the rest of the year resulted in savings of over $270,000. This is approximately the purchase cost to the Authority of their Sikorsky S-58.

The Authority realized after the early operations that the helicopter was not a mere adjunct gadget, but that in the construction of transmission lines this medium had to become the center of all planning in order to achieve the most efficient result. Thus a helicopter section was formed and given priority by the Authority in order to accelerate construction. This section plans and directs helicopter operations and continued experimentation toward new applications. It has organized its personnel into crews specialized for construction with helicopter.

As ground work for helicopter operations, once the survey of a proposed transmission line is complete and the right of way secured, locations are selected for staging material from warehouse to construction site. These staging areas mean fewer expensive flight minutes for hauling by helicopter. A staging area crew of the helicopter section weighs, marks and lays out loads for later hauling. They must weigh poles since the S-58 aircraft's net load limit has been 3750 lb on this job. They package crossarms and hardware for each structure with steel strapping. Tagging all materials and identifying sites with large panels readily visible from the air speed operations. Meanwhile another crew is digging holes.

The arrival of the helicopter brigade with its complete mobile camp at the first staging area marks the beginning of the actual air construction phase. Composition of this organization is shown in the box. The helicopter's first function is the transport to their various work sites of construction crews with equipment. Crossarm packages are the first materials moved. The pilots, on contract from Petroleum Helicopters Inc, spot them within a few feet of excavated holes. They have



DIRECT STRINGING OF CONDUCTOR by helicopter eliminates pulling line. Cable is attached to the oil drum seen framed in second structure

NEARNESS OF HOT LINES does not bother helicopter. It obviates construction roads too

Builds 115-Kv Lines With Helicopter

also become adept at directly planting the 55- to 65-ft poles used for these 115-kv transmission lines. Four linemen on the ground assist in pole setting and recovery of slings. In difficult terrain the 'copter moves this team by air.

This sets the stage for the wire-stringing operation in which the helicopter pulls in the conductor directly without the use of pulling lines.

This operation requires detailed planning and close coordination. The helicopter section supervisor, pilots and foremen of the various crews meet each evening to coordinate the next day's work. Much use of models and blackboards gives a clear representation of plans, terrain and proposed operations. The plans are subject to thorough examination and changes to improve the work are there incorporated.

Again the first order of the day is the transport of crews and equipment, including walkie-talkie radios and colored flags for communications. The movement by air of all crews takes less than a half hour as compared with up to four hours by other means. The first crew in the field covers barbed wire fences with rubber hose and assures that the right of way is completely clear where cable is to be pulled. A major material load is a wire-reel wagon of special lightweight construction, designed and built by the helicopter section of the Authority, since no equipment on the market met the requirements of this new operation. The aircraft also transports the reels of wire to the unreeling site and the pulleys for crossarms to the poles.

Pulling of the wire requires a cable-hauling sling. This consists of a 50-ft length of half-inch steel cable attached to a steel wire net holding a 50-gal drum. The conductor attaches to this sling for pulling. The weight of the drum holds the cable below and free of the whirling blades of the 'copter.

Ground crews and linemen pass the cable through the pulleys of the first pole by hand. A lineman on the crossarms of this structure attaches the cable to the sling dangling below the helicopter. The pilot hauls the conductor to the next structure, where two linemen insert it into the side-opening pulley. The 'copter hauls to each tower until it reaches the deadend final structure. The pilot radios the reel crew to clamp the cable at the first structure and waits until this is done. He then

(*Continued on page* 91)

MEN AND EQUIPMENT that keep a helicopter going in the field for pole hauling and erection are these:

2 pilots	2 drivers
3 mechanics	1 office trailer
1 foreman	1 sleeping trailer
4 linemen	1 utility truck

1 2000-gal gasoline truck

WIRE STRINGING requires these added facilities:

1 3000-gal gasoline semi	1 warehouse tent
1 power wagon	1 mess tent
1 station wagon	1 collapsible washroom
2 sleeping tents	1 collapsible latrine

SEE Survey of Members Shows Wood Pole

FRANK A. JENKINS, Asst Transmission Engr, Duke Power Co, Durham, N. C.

The tabulation was compiled from replies by sixteen member companies to a Southeastern Electric Exchange survey on wood pole design factors.

Notes

1. (Item 8) Full text of survey question is "How do you make use of the added structural strength when X-braces are used? (a) Multiply resisting moment of two poles by an average factor? (b) Calculate strength of each structure (for each class pole and each pole height) to determine maximum span lengths?"

Companies Reporting	1	2	3	4	5	6
1. Line Voltage (Kv)	110	110	110	132	138	132
2. Structure Type	HF	HF	HF	HF	HF	HF
3. Pole Class	2-3	2-3-4	1-2-3	1	1-2	3-4
4. Ult. Fiber Stress (CSYP)	7400	7400	7400	5600 WRC	7400	7400
5. Factor of Safety	3	2	4	4	4	3.5
(A) Grade B (SF-4)	YES	Y-U	Y-U&R	NO	Y-R	Y-CROSS.
(B) Grade C (SF 2.67)	Y-U&R	NO	NO	NO	NO	NO
(C) Grade C (SF-2)	NO	Y-R	NO	NO	NO	NO
(D) Grade N	NO	NO	NO	NO	NO	NO
6. Are X-Braces Used	NO	SOME	YES	YES	YES	YES
7. For Longer Spans	NO	YES	NO	YES	YES	YES
8. Structure Strengths Determined						
(A) Factor Applied to MR.		NO	NO		NO	NO
(B) Structure Strengths Computed		YES	YES	CALC. FOR TYPICAL STR.	YES	YES
9.(SF-4) MR. 2 Pole or Compute	MR.2 POLES	COMPUTE	COMPUTE		COMPUTE	COMPUTE
10. Hor. & Vent. Span or Avg. Span.	MAX. SPAN	EACH STR.	EACH STR.	EACH STR.	AVG. SPAN	EACH STR.
11. Type Cross Arms Used	SPAR	SPAR	RECT.	D. P.	RECT.	RECT.
12. Cross Arm Dimensions	CL.1-2-3-30'	$8\frac{1}{4}$"x 33'	6"x 8"x 29'	$3\frac{3}{4}$"x$9\frac{1}{2}$"x32'	$3\frac{5}{8}$"x$8\frac{1}{2}$"x32'	5"x 7"x 28' & 6"x 8"x 28'
13. Ult. Fiber Stress (CSYP)	7400	7400	7400	7700 FIR.	7400	7400
14. Factor of Safety	4	6.73	4	4	10	4
15. Do Arms Sag	NO	YES	YES	NO	NO	SOME
16. How Corrected		KNEE BRACE AIR DRY	DA			NOTHING
17. Conductor Loading						
(A) Design Load Used	$\frac{1}{4}$"-4"-15°	1/4"-8"-15° 0"-12"-30°	$\frac{1}{4}$"-8"-15°	$\frac{1}{2}$"-8"-0°	0"-50"-30°	$\frac{1}{4}$"-4"-15°
(B) Actual Loads Expected	0"-9"-30° 0"-20"-30°	1/2-0"-0° 0"-12"-30°	$\frac{1}{2}$"-0"-15°		0"-25"-60°	$\frac{1}{4}$" V & 20° TR.
18. Are NESC Loads Adequate	YES	NO	YES		YES	NO
19. How are NESC Constants Used						
(A) In Conductor Loadings		YES	NESC 4th ED		NESC 5th ED	FOR SAG CAL
(B) In Structure Loadings		NESC 4th ED	NESC 4th ED			
20. Have Poles Failed	NO	YES TORNADOES	YES TORNADOES	2 STRS. TWISTERS	NO	NO
21. Failures Occured Where		GRD LINE	GRD. LINE	OVER TURNED		
22. How Were Loads Applied		SUDDENLY	SUDDENLY			
23. Have Bolts Failed	NO	NO	BENT	NO	NO	THRU. BOLTS YES
24. Other Comments				7" SNOW BUT NO FAIL		

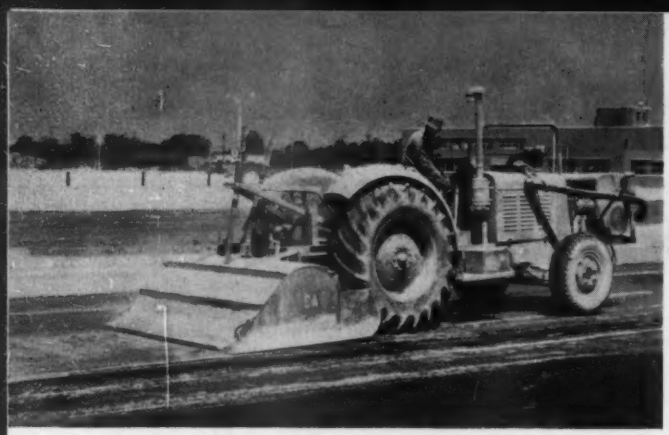
Construction Practices for Transmission

2. (Item 9) Full text of survey question is "Where Grade B construction is required by NESC do you compute structure strength when X-brace is used or use maximum resisting moment (value of X-brace not considered) of two poles only?"

3. (Item 10) Full text of survey question is "Do you determine wind span (horizontal span) and weight span (vertical span) for each structure to determine loading or do you use the average span method?"

4. Abbreviations: MR = resisting moment of two poles, STR = structure, NESC = National Electric Safety Code, U = urban, R = rural, HF = H-frame, SF = safety factor, DP = double plank, CSYP = creosoted Southern Yellow Pine

7	8	9	10	11	12	13	14	15	16
110	166	110	110	110	110	138	138	115	138
HF	HF	HF	HF	HF	HF	HF	HF	HF	HF
1-2-3	1-2-3-4	2-3	1-2-3	2-3-4	3	2-3	1-2-3-4	1-2	1-2
7400	7400	7400	7400	7400		7400	8400	7400	7400
2	2	2.47	4	4		2 RR-4	4	4	2
Y-U&RR		Y-CROSS.	Y-U & R	NO		Y-R	YES	Y-U&R	Y-R
Y-R CROSS.		YES	NO	Y-U & R			NO	NO	NO
Y-R		YES-R	NO	NO		Y-R	NO	NO	NO
NO		NO	NO	NO		NO	NO	NO	NO
YES	NO	SPECIAL CASES ONLY	YES	YES		YES	YES	YES	YES
YES	NO	NO	YES	YES		ALL STRUCTURES	YES	YES	YES
NO		HUGHES ANALYSIS		NO			NO	NO	
YES		YES	YES	YES	NO		YES	YES	YES
COMPUTE		COMPUTE	COMPUTE	COMPUTE		NO	COMPUTE	COMPUTE	COMPUTE
EACH STR.	EACH STR.	EACH STR.	EACH STR.	AVG. SPAN		NO	AVG. SPAN	EACH STR.	BOTH METHODS
SPAR	D.P.	SPAR	SPAR	RECT.	SPAR	D.P.	SPAR	D.P.	RECT.
	3"x 10"x34'	27"CIR.-29'	7"-12"	6"x 8"x 29'	30'-CL.5	3¾"x8¾"x38'	7"MIN x 30'	2¾"x7¾"x 29'	6"x 8"x29'
7400	7400	7400	7400	7700		7400	8400	7400	7400
4	4.5	4	3-4	5		VARIES	10	4	NOT CRIT.
NO	YES	YES	YES	YES	NO	NO	YES	NO	NO
	COMP. BRACE	S.F.-6.73 AT 60° LOAD	LET SAG	KNEE BRACE			S.F.-10 OR KNEE BRACE		
½"-8"-0°	½"-8"-0°	0"-9"-30° 1/4"-4"-15°	½"-4"-15°	NESC 4th ED		NESC HEAVY	0"-9"-30°	0"-9"-30°	0"-50"-60°
½"-8"-0°	½"-8"-32°	0"-9"-30° 1/4"-4"-15°	LESS THAN NESC	NESC 4th ED			0"-18"-60°	0"-33"-70°	0"-50"-60°
NO	YES-EXCEPT HIGH ELEV.	NO	YES	4th ED-YES		NO	NO	NOT AT ALL	NO
NESC 4th ED	NESC 4th ED	RES+K TO GET MAX. TEN	FOR SAG CAL.	NO			MFGR. REC	60° 25% ULT. OF COND.	9"+0.05
NESC 4th ED	NESC 4th ED	NESC 5th ED	ACTUAL ICE & WIND	5th ED			S.F. 4/9"	S.F. 4/9"	S.F. 2/50# WIND
NO	YES-JOINT FAILED	NO	YES-BAD POLE	NO	NO	NO	ANCHOR SLIP. HURRICANE	NO	YES ANCHOR SLIP.
			GUY ATTACH				BOTTOM OF X-BRACE		GRD LINE
	SUDDENLY		SUDDENLY				HURRICANE		SEE 20
NO	NO	NO	EYE BOLT DEF. WELD	NO	NO	NO	NO	NO	NO
					DATA NOT AVAILABLE				



ROTATING TEETH of Seaman Pulvimixer blends soil, aggregate, flyash, and lime to produce a paving with a compressive strength of approximately 1,500 psi

Flyash Cuts Brentwood Paving Costs

Steam station by-product and lime gives lasting surface in new operations center's vehicular and storage areas at new site

NORMAN FALKIN, Engineer, Long Island Lighting Co, Hicksville, New York

Flyash in a pozzolanic reaction with lime to form a cement-like material gave Long Island Lighting Co a lasting paving for its new Brentwood Operations Center.

Although this use of flyash is relatively new, the principle upon which it is based is as old as the Romans. Those empire builders, archeologists say, used the chemical interaction between volcanic ash and lime to make the cementatious combination that persists in Roman masonry to this day.

Flyash and lime, mixed with soil from the site, aggregate, and the proper amount of water completed the Brentwood 6-in. course which will continue to harden for some time. Eventually, it will be a mass with a compressive strength of about 1,500 psi. Wearing surfaces of either 1½-in. asphaltic concrete for roads and parking areas, or oil and sand for storage areas finished off the very inexpensive semi-rigid pavement.

No Materials Removed

Originally, the Brentwood site was covered with a layer of clay and organic material up to 18 in. thick, over clay-and-loam strata which varied in depth from 8 to 25 in. Below the clay and loam was a mixture of sand and gravel.

Conventional paving methods would have involved the costly removal of the organic, clay, and loam materials. But soil analyses indicated that the top layer of clay and organic material could be stabilized with lime and that a relatively impervious base course could be placed over it. This would obviate removal of any material from the site.

The use of flyash, usually a waste by-product of coal burning in the company's power stations, promised more savings. Thus LILCO decided on a process of lime-flyash-soil stabilization for the paving.

After the necessary clearing and grubbing, the area was rough graded to about sub-base elevation. Hydrated lime—12½ lb per sq yd—was spread and thoroughly blended into the top 6 in. of the in-place soil. This lime treatment greatly reduced the plasticity of the material and, after compaction to 95% density, provided a relatively compact 4-in. layer, with good drainage properties, upon which to place the base course.

In constructing the base course, workmen first spread a 6-in. layer of suitable soil upon the compacted subbase. The soil was taken from the drainage basin excavation on the site. A 2-in. layer of bank run aggregate was then added to give the necessary additional coarse material in the base. To this was added 60 lb per sq yd of flyash, and finally, 30 lb per sq yd of hydrated lime. These materials were thoroughly mixed to a uniform blend.

Water was added, or moisture was reduced by mixing until the design moisture content was reached. This mixture was then compacted to a 95% density. Rain before compaction does no harm, as the process permits the evaporation of excess moisture. Such a base can be used immediately after compaction despite the fact that hardening continues over a long period.

Areas for vehicular traffic and parking received a tack coat of medium-curing cutback asphalt and 1½-in. layer of asphaltic concrete Mix No. V laid in accordance with the Asphalt Institute Specification A-2a for hot mix, hot-laid asphaltic concrete paving.

Areas for the storage of poles and other equipment had the base course treated with two coats of Asphalt Institute Specification RC-3 road oil and sand.

Cost $2.41 Per Sq Yd

The design for the base course specified, by weight, 5% lime, 10% flyash, 25% aggregate (bank run), 60% soil from the site. It also specified a 7% optimum moisture content and a dry density of 127 pcf. The total paved area was about 85,000 sq yd, almost 18 acres, of which 72,000 sq yd were for roads and parking, and 13,000 sq yd for storage. The total cost of the asphaltic surfaced area was about $2.41 per sq yd, and that of the oil sealed area $1.73 per sq yd.

Lime used conformed to ASTM Specification C-207 for type "N" hydrated lime. Flyash came from LILCO's Port Jefferson Station Unit 3 silo and conformed to ASTM Specification C-379 "Flyash for Use as a Pozzolanic Material with Lime."

Laboratory samples, using the materials and design mix for the base course, averaged 1,285 psi when tested after seven days of curing.

A SPECIAL REPORT

The need to do more jobs

in a given amount of time

plus the need to lower

utility operating costs

is resulting in . . .

FLEETS on the move toward greater utility

Utility fleets are on the move. As they enter the decade of the sixties, fleets are being equipped with a wider range of vehicles that will provide greater utility, offering increased productivity and lower operating costs.

In autos, the trend is to the compact car, which promises to provide basic transportation at a lower cost. This trend should increase rapidly, not only because autos are replaced relatively often, but also because the switch to compacts presents no great problems. However, as the first article in this report seeks to show, opinions and experiences with compacts do differ.

In trucks, the trend is to ever greater mechanization that frees construction and maintenance crews' time for their more specialized skills. This trend is understandably slower because more areas of a utility's operations are involved, and because of the longer life span of trucks. The second article focuses on the greater utility of trucks being used today.

PAUL F. ROMAN,
Associate Editor

Compact Cars Move Into

Some utilities have already placed their bets; others are looking and waiting. All agree, more or less, that they are more economical and less comfortable than conventional cars

Compact cars are moving in to become the workhorse of electric utilities' passenger car fleets:

• Connecticut Light & Power Co expects its fleet will be 80% compact by 1962.

• Almost all of Commonwealth Edison Co's 1200-car fleet will be made up of compacts by 1964.

• Tampa Electric Co is "rapidly replacing" most of its fleet with compacts.

• Pacific Gas & Electric Co says two-thirds of its 1800-car fleet will be compacts eventually.

This is an indication of the trend to compacts, still in its early stages, but destined to become more widespread as compacts make their expected impact on the American car market.

Compacts Increase Share of Market

To get an indication of the impact so far, take a look at the latest Detroit sales figures:

In the first three months of 1959, out of some 1.3 million cars sold, 8% were compacts and 61% were the conventional low-priced-three. In the first three months of this year, out of some 1.5 million sold, compacts had jumped up to 23% of the total, and the low-priced-three had dropped to 46% of total sales.

In a spot survey of almost a score of electric utilities, all replied they were experimenting with compacts. Some, as indicated above, have already decided to make the switch; others are taking a more cautious "wait-and-see" attitude:

• Philadelphia Electric Co which already has some 46 compacts in its fleet of 483 cars, says it doesn't plan to buy any more this year until it gets more data on its present compacts.

• Georgia Power Co is experimenting with compacts but says it has too little data to make a decision.

• A northwest utility is seriously debating whether there is a need for compacts in its operations. However, it is putting various compact makes through their paces.

• Detroit Edison Co says it is just beginning to try out the compacts, using samples of all the major makes.

Opinion Giving Way to Facts

These are some examples of how electric utilities are reacting today to the launching of compacts on the market. When compacts were just beginning to appear a few years ago, only a small number of utilities even considered using them. Opinions were expressed regarding their implementation, with few facts or operational data to back them up. Today, the situation is reversed and opinion is giving way to facts.

To be sure, some men are still opinionated. One utility transportation manager says, "In 1955 the auto industry started going nuts! All they've done since then is build bigger bodies, longer outside and smaller inside. Cars have more power than we need for fleet purposes. Brakes are also inadequate."

Yet another says, "I think when we're ready to turn them in, these compacts we're buying will be nothing but a pile of junk."

However, no matter what their personal opinions may be on the subject, utility transportation men agree they must try out compact cars and see if they can fit them into their operations, if only because they promise savings in the operating costs of their fleets.

Some have taken the plunge more rapidly than others: Clyde E. Merrill, Tampa Electric's transportation man explains, "It is a known fact that it costs so much to move a ton a mile at any given speed, and we feel that the compacts can do this more economically than the larger cars without affecting the work of our

Twelve-Month Data on Conventional, Compact, and Foreign Cars

	Conventional "C" (Owned)	Conventional "C" (Leased)	English "A" Sedan	English "A" Stat. Wagon	German "O"	Compact "L"
Number in Use	238	2	2	1	2	1
Miles per Gallon	14.76	12.86	20.23	17.65	20.06	16.50
Cost per Mile (¢)						
Operation & Maintenance	6.17	8.06	4.78	3.76	3.58	2.17
Depreciation & Insurance	3.03	.....	2.87	2.97	3.33	2.20
Total	9.20	8.06	7.65	6.73	6.91	4.37

Courtesy of Rochester Gas & Electric Corp

employees or the company's service." Tampa Electric purchased one of each type and put the small cars to the test. They were driven by personnel from practically every department of the company and even by top company officials. Almost every one participating in the test driving was high in their praise of the smaller autos and their operational and parking ease. "Some of our compacts now have over 5000 miles on them," Merrill says, "and we have had no serious problems with any of them."

On the other hand, L. Edsall, of Philadelphia Electric's transportation department, feels that 5000 miles on a car is not enough to get a good idea of operating costs. He'll put more miles on his compacts before he makes a decision on them.

Another utility made the decision for compacts before it had any detailed cost analysis. Right now, the utility is in the process of justifying its decision by setting up a cost-accounting system on IBM cards.

Vice Presidents Use Compact Cars

N. J. McKenzie of Southern California Edison Co's transportation department says his company first tried out the smaller foreign cars, but found they were limited in their usefulness, generally, to commercial service and meter-reading assignments. They then experimented with the two compacts then on the market and found them useful for the following functions: meter-reading, commercial service, home economists, customer relations, distribution estimating, commercial sales, right-of-way representatives, substation construction general foreman, construction engineering, contractor pool service, and company pool service. Other compacts were subsequently put on the market, and following tests, Southern Cal Edison found them useful for vice presidents, department heads, division heads and the like. As a result, up to 90% of the utility's fleet will be compacts eventually.

Niagara Mohawk Power Corp, which uses station wagons extensively in its passenger car fleet, is switching, for the most part, to compact station wagons. Donald Wilson, of Niagara Mohawk's transportation department says conventional station wagons have gotten too big for many assignments.

Compacts "Too Small" for Taxi Service

Louisiana Power & Light Co's C. Clyde Crockett likes the compacts and feels they are better built versions of 1952 or 1953 conventional models. Right now, he says he is working up through the job classifications as he replaces conventional cars with compacts. Eventually, compacts will comprise the majority of LP&L's fleet.

R. O. Babcock, of Consolidated Edison Co's transportation department, says he doesn't think compacts will represent over 50% of its car fleet. Right now, Con Ed has some 90 in its 212-car fleet, and uses them for first and second-line supervisory personnel. But Babcock believes the compact's small size will exclude their use in the taxi service the company operates for their personnel.

TAMPA ELECTRIC CO's compact cars will show the public that the company is economy minded in its car fleet

Utilities' use of compacts leave them with the following impressions:

On the minus side, nearly all the utilities queried agree that they are not as comfortable for longer trips. However, there are differing opinions as to what constitutes a "longer trip." One of the utility men feels that any trip over 25-30 miles is uncomfortable in a compact; most think the figure should be around 50; and a few push it up to 100 miles.

R. L. Kalp, transportation engineer for Connecticut Light & Power explains, "If four or five people drive from Connecticut to Boston or New York in the same compact car, it is a little bit inconvenient." But 80% of the time, he points out, the men are driving alone. Nevertheless, CL&P will allow compact users to switch to conventional cars for longer trips if they wish. As of now, CL&P has only 33 compacts in its fleet of 178 cars, but Kalp notes that one of the compact lines is the most sought after car in the fleet.

Another transportation man points out that this topic, comfort, will decrease in importance as acceptance of the compacts by the public becomes more prevalent. In other words, he feels that eventually the riding qualities of the compacts will become the standard, replacing the present conventional low-priced-three standard.

Reaction to Compacts "Surprising"

As to their size, nearly all utilities are agreed that space is limited in the compacts.

But opinions differ as to whether they are easy to get in and out of. One utility thinks they are harder to enter when parked at a curb than conventional cars; another thinks the reverse.

And home economists at Mississippi Power like the compacts because "they can put their equipment in the car with ease."

Another drawback to the compacts, mentioned occasionally, is their lack of flexibility as far as assignments from the pool are concerned. In some utilities, not all echelons of management will accept compacts. Therefore, compacts lose some of their usefulness when assigned to pool service.

Reaction to the compacts has been "surprising." Most transportation managers had expected an unfavorable reaction from users, which, for the most part,

has failed to materialize. True, there are some who just don't like the compacts; larger men understandably hold this opinion. But, by and large, utilities have found that drivers are generally pleased with them.

Another plus factor for the compacts mentioned is their off-the-highway capabilities. Although Southern Cal Edison finds they don't have enough power for this type of service, another west coast utility finds just the opposite is true. Attributes cited are shorter front and rear overhang, and greater road clearance in those compacts which have 15-inch wheels. (Others have 13-inch wheels). This is seconded by Randolph Whitfield, of Georgia Power Co's transportation department. He feels that the lighter weight and shorter wheelbase allow compacts to negotiate through hedgerows and rough country more easily.

The combination of less horsepower and larger wheels is also a plus factor in Connecticut Light & Power's book because of the greater traction in slippery weather which this combination provides. And CL&P's Kalp also mentions the larger brake area of some of the compacts as a safety factor.

Utilities Report on Economy

Of course, the key reason behind the trend to compacts is economy. Here are the findings of several utilities:

• Commonwealth Edison says "Annual savings on the compacts amount to $100 per year, including carrying charges, gas, oil, tires and repairs." The company says initial costs are lower, mileage is better, maintenance is lower, and depreciation is less.

• Louisiana P & L says the initial cost of a compact is $200 less than that of a conventional car. Although cost figures are not yet complete, LP&L's Clyde Crockett says he expects to save "at least ½¢ per mile, but probably the figure will turn out to be ¾¢ or possibly even 1¢ a mile." Throughout the life of the car, the total savings will probably be $550.

• Southern California Edison is less specific. It terms initial costs lower, and says present indications are that savings in operation and maintenance will be "considerable." It also feels there is less depreciation as well as a saving on license plates and tires. Mileage reported is 20-22 mpg.

• Tampa Electric says the savings in its state on license plates alone is $10 a year per car. It also finds insurance costs are 10% less, and that it takes 20% less time to clean and polish the compact cars.

• Consolidated Edison has no cost figures to give out, but says the average mileage on its compacts is 21 mpg as against 12 mpg on its conventional cars.

• Mississippi Power, which has 10 compacts in its fleet now and expects to buy 20-30 more in the next two or three years, finds that compacts aren't as economical as advertised. "The mileage is certainly not what it has been advertised to be," says a spokesman. As an example, the utility is getting somewhere between 17½ and 18½ mpg on its compacts, whereas its conventional cars get 14 to 19 mpg. Another thing that Mississippi Power is watching closely is the tire mileage. Apparently, on one of its earlier compacts, the tires had to be replaced after 5000 miles.

Moderation Called For

• Georgia Power Co's R. Whitfield, who is watching the new cars very closely, also feels that the compacts are not as economical as advertised. So far, he has found that the increase in gas mileage over conventional cars is on the order of 33%. And on operation and maintenance costs combined, he thinks that savings will amount to about 25% of the same total costs on conventional cars.

But Whitfield interjects a note of caution and moderation. He feels that these savings must be considered from the overall perspective of total fleet costs, both auto and truck. From the standpoint of a utility fleet's capital expenditures, he assumes that annual auto replacement costs constitute about 20% of the total. If compact cars are 10% cheaper to buy than ordinary cars, then the savings in the total fleet capital expenditures each year amounts to only 2% of that budget.

And in operating costs, he points out, assuming that one-half the auto fleet is compact, and assuming that 20% of the total fleet's operating cost are devoted to autos, then a 25% reduction in auto operation costs through the use of compacts amounts to only a 2.5% decrease in the operating costs of the fleet, both truck and auto.

All Savings Are Significant

Nevertheless, Whitfield is quick to stress that no matter how small and insignificant the savings are, it is his policy, as well as Georgia Power's, to take advantage of them and put them into effect. Therefore, though Georgia Power has not made an official switch to compacts, it will put them into service wherever the economic benefits outweigh other detractions.

• Connecticut Light & Power says initial costs savings amount to $200, and estimates that operation and maintenance savings, in addition, will amount to $100 per car per year. CL&P, which first started buying compacts two years ago, also has a record of the mileage performance of its compacts. This is shown in table on p 47 which compares conventional car mileage with that of compacts, all cars having standard stick-shifts. This comparison shows the performance of the compacts is somewhat better than that of the conventionals, averaging one to three mpg better. Of course, on individual cars, the spread is much larger, and in some cases is reversed, with conventional cars

Production of Electric Cars Begins

Production of the Henney Kilowatts is now starting at a plant in Bloomington, Ill. Delivery of the cars will begin in 90 days.

Latest report on utility ordering of these cars from the Eureka Williams Corp, is that "150 to 200 orders are in the process of being finalized." As of March, the number of firm orders was 76.

Comparison of Mileage Between Compact and Conventional Cars

	Compact "R"		Compact "L"		Conventional "F"		Conventional "C"	
	No. of Cars	Avg. MPG	No. of Cars	Avg. MPG	No. of Cars	Avg. MPG	No. of Cars	Avg. MPG
Urban-Suburban Districts								
New Britain	1	18	....	....	7	11	3	13
Bristol	3	17	....	....	....	....	3	13
Meriden	3	17	1	11	8	13	....	....
Norwalk	3	18	....	....	5	12	6	13
Greenwich	....	....	....	....	5	15	2	15
Waterbury	2	14	1	13	13	13	11	13
Rural & Mixed Districts								
Danielson	3	17	....	....	3	13	3	15
Willimantic	2	17	1	17	5	16	9	15
Essex	1	new	1	16	9	14	3	15
Berlin	1	20	1	18	19	15	11	15
Northern	6	20	1	19	9	16	....	....
New Milford	....	....	1	12	7	15	....	....
Winsted	....	....	1	20	....	....	1	18
Montville	....	....	....	....	1	13	....	....
Devon	....	....	....	....	....	....	1	16
Total Cars	25	....	8	....	91	....	53	....
Total Average MPG	....	17.5	....	15.6	....	14.0	....	14.6

Courtesy of Connecticut Power & Light Co

having better mileage than compacts.

• A large west coast utility finds that initial cost difference is $300, mileage is 20% better, and maintenance costs are cut by 20%.

• Rochester Gas & Electric has made some 12-month cost studies, comparing conventional cars with a compact and several foreign cars. These costs are reproduced on p 44. Admittedly, the cost figures on the compacts involve only one, one-year-old car, compared to the two-year average age of the conventional cars. But RG&E's W. B. Streitle is hopeful that compact maintenance costs will remain low. He is therefore going to compacts on a limited scale.

Depreciation Is Questioned

• Philadelphia Electric, says it is saving $30 per car per year in gas, and is registering other savings in initial costs and maintenance. But PE's Lynn Edsall points out that the initial cost of some compacts is lower than it would normally be because of the promotions some auto companies are running to encourage the use of their cars in fleets.

The most important factor to Edsall, and one on which there is very little data, is the question of depreciation and resale value. Edsall feels that the resale value of compacts, after six years service in his fleet, will be close to nil. And until he can get more accurate information, he doesn't believe it is possible accurately to determine the economics of the compacts.

Ralph Kalp of CL&P, who has been in the compact market for two years now, says that so far, he finds the resale value of compacts is better relatively than that of the conventional cars. Specifically, Kalp finds he can get as much of a trade-in allowance on compacts as he can on his conventionals, yet his compacts are $200 cheaper to buy than his conventionals. However, Kalp adds that he doesn't know how the resale value will hold up in two or three years after compacts are more prevalent.

Perhaps the most logical argument is that presented by another transportation man. He believes compacts will do no better or worse, as far as resale value goes, than the conventional cars do today. His reasoning is, "Why should relative resale values be any different if compacts take the place of the present low-priced-three American cars?"

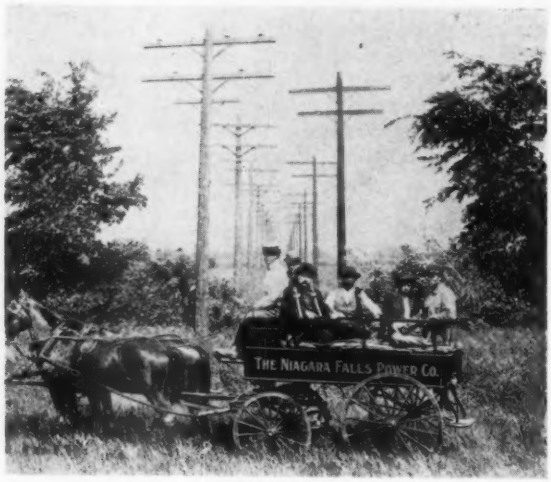
Public Relations Biggest Factor

And this leads into the last and perhaps most telling argument in favor of utility compact fleets. This is, assuming that compacts continue their present penetration of the American car market, utilities will have no choice but to accept the compacts as the workhorse of their fleets, just as the low-price-three are the workhorses of today.

Tampa Electric puts it another way: "Millions of dollars are being spent by the automobile manufacturers in national advertising and publicity to get the American public compact car and *economy* minded. And Tampa Electric officials feel that the firm's customers will think a lot more of the company and its efforts to hold the line on rising operational costs and rates if they see the bulk of its auto rolling stock in the compact car category."

Line Trucks and Equipment Have

In addition to providing transportation, they increase the productivity of crews



VINTAGE 1906 LINE TRUCK, used in the construction of first transmission line between Niagara Falls and Syracuse.

In truck fleets, the all-pervasive trend can be described in two words: greater utility. This is especially true for line trucks used in the construction and maintenance of overhead distribution lines. Utilities are finding that they hold the real key to increasing productivity and lowering system operating costs.

As with other industries, this last decade has witnessed the exponential increase in the productivity of crews, brought about through the introduction of equipment that frees crews from backbreaking labor and enables them to concentrate on their special skills.

The trend now appears to be splitting in two directions. One is the use of heavier, larger line trucks to be used by the traditional large crews. On these trucks are crammed as much power equipment as possible. The logic behind this is simple: Since crew operating costs are ten or more times the operating costs of the large line trucks, investment in larger, better-equipped line trucks will be more than offset by the crew time saved through the use of the new equipment.

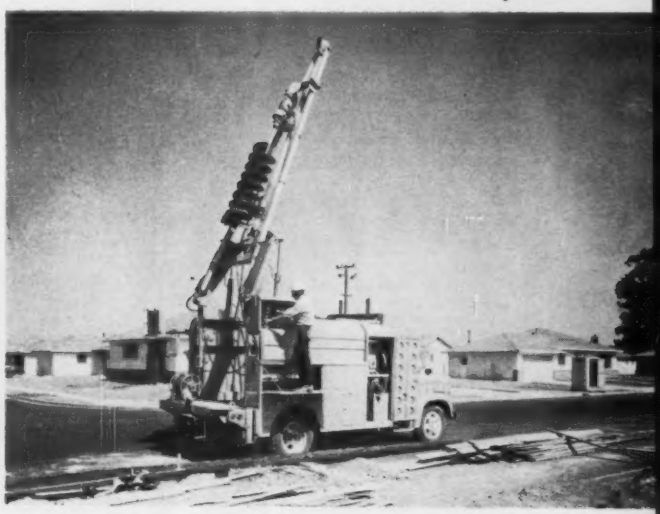
The other trend is the use of smaller trucks and crews. The logic behind this is also simple: Since equipment of today is more productive, fewer men are needed to perform the work. By shrinking crew size to four, three, or even two men, and equipping them with highly mechanized equipment, these crews can ac-

MISSISSIPPI POWER CO last year set up its first three-man electric service crew. Shown above is the specially-designed line truck the crew is using. The truck cost roughly one third the price of larger line trucks and weighs less than half as much. The crew, consisting of two electric servicemen and a helper-driver, works on small distribution orders including extending lines on existing poles and changing out conductors. They also install and remove small distribution transformers and perform the regular electric service duties such as setting meters. Mississippi Power plans to add other such crews wherever it is economically feasible

CONNECTICUT LIGHT & POWER CO's latest addition to its truck fleet is shown above. This heavy duty line truck with hydraulic derrick and auger will be used mainly for pole-setting work using a six-man crew. CL&P is getting another of these soon, bringing the total close to ten. Other recent additions to the company's fleet are about 50 aerial basket trucks that use a three-man crew. CL&P has had these trucks about a year and is currently using them for an extensive pin-replacement program. When this is completed, probably this year, CL&P will experiment with the basket trucks to see where else they can be used in its operations

Come a Long Way

NIAGARA MOHAWK POWER CORP's latest line vehicles, above, illustrate dramatically the greater utility of today's fleet. The basket vehicle (left) can also set poles, which can be swung full circle around the vehicle without the use of outriggers. Outriggers are also unnecessary for basket vehicle (right) which utilizes a dual-wheel, one-ton chassis. Maximum manual working height is 36 ft. Niagara Mohawk says the trend is to smaller crews



LOUISIANA POWER & LIGHT CO's newest line truck (above) represents the company's second generation of two-man vehicles. LP&L first started using two-man vehicles in 1947, and now has 27 of these vehicles, one for each district. These trucks handle all but the heaviest construction jobs. LP&L hopes to begin adding aerial-basket devices mounted on small one-ton truck chassis, using a two-man crew. For every four such units there would be a completely mechanized two or three-man crew. For larger jobs, a combination of these units would be used. All vehicles would be equipped with two-way radio

PACIFIC GAS & ELECTRIC CO is experimenting with a "power-pac," a four cylinder, 65-hp gasoline engine-mounted on the line truck in a compartment behind the cab (see above). The idea is that this engine will supply power for all the truck's tools more efficiently than the truck's regular engine. Another innovation PG&E is experimenting with is the use of hydraulic jacks under each corner of the truck, all controllable from the cab. Thus one man can straighten poles during installation. PG&E says its more mechanized fleet enables the building of 20 to 30% more lines per day with the same size crew

VARIETY IN DESIGNS of mechanized equipment is great, but both trucks need only a small two or three-man crew

Mechanized Trucks Save Manhours

Work Performed	Total man-hours Crew "A"*	Total man-hours Crew "B"†	Hours Saved
Installation of guy wires in proximity of energized 33 KV line and preparation for connection of transformer	40	24	16
Spiced wires in mid-span and moved to new bay, replaced conductors	60	32	28
Preparation and stringing of three 4/0 wires over street and primary lines	55	28	27
Moved 7200 KV dead ends and prepared for wire stringing	40	16	24
Disconnected 4 KV transformer and moved to new location	40	20	20
Installation of ropes and blocks and stringing of three 2/0 wires across highway	50	28	22
Moved temporary 12.5 KV energized line to permanent position	32	20	12
Energized 12.5 KV single-phase and changed conductors	30	16	14
Spliced two 4/0 wires in midspan and moved dead ends	35	20	15
Changed phase taps over energized 11 KV line	60	24	36
Installed and cut in 34 KV switches and removed old equipment	120	64	56
Moved line and spliced, disconnected and reconnected transformers	45	28	17
Installed arresters and cutouts for 12.5 KV cut-over	30	16	14
Installed 10′ five-pin arms and prepared blocks and ropes for stringing wire	50	28	22
TOTALS.....	687	364	323

* 5-man crew using line truck with winch & manually-erected derrick
† 4-man crew using two-basket aerial beam truck

complish the bulk of tasks originally performed by the large crews.

Spokesmen for this point of view point out other benefits. A fleet built around the smaller truck units is much more mobile and flexible. A greater area can be covered in a given period and any size job can be handled by these crews merely by bringing two or three crews together for the larger jobs.

The statement is generally made by those having experience with the use of smaller crews, that insofar as economy is concerned, the added cost of the equipment, such as three-man trucks equipped with a hydraulic derrick and auger, can be paid off in a short time through the savings in the crew costs.

Although the trend to greater mechanization is prevalent in most utilities, there are some who feel utilities have not been able to switch to (and take advantage of) this newer equipment rapidly enough. For one thing, truck life in generally long. More important is the fact that complicating factors are involved, such as existing safety practices, labor contracts, and the amount of capital investment needed for this equipment. Some transportation men also feel that management often has not concentrated sufficiently on this method of cutting operating costs.

Of importance also is the fact that utilities have had to feel their own way in integrating this equipment into their operations. Information on others' operating experiences has been scarce and generally limited to that exchanged in transportation conferences and through personal relationships.

W. B. Streitle, chairman of the EEI Transportation Committee, thinks this useful flow of information can be quickened. "Another meeting a year would help," he says. In addition, he believes it might be possible to institute a regular "newsletter-type" interchange of information, possibly under the auspices of EEI, and limited in distribution to utility personnel directly concerned with transportation. "When we, who are concerned with fleets, are armed with a greater array of useful facts on what this equipment has done in other utilities, then we'll have a better chance of convincing our management to consider using this equipment." The annual AGA-EEI transportation conference to be held in New Orleans next week affords an opportunity to consider this.

GENERAL ELECTRIC ANNOUNCES . . .

A NEW METHOD OF TRANSFORMER RATING

DEVELOPED SPECIFICALLY TO LET YOU TAKE FULL ADVANTAGE OF THE BENEFITS OF GENERAL ELECTRIC'S PERMALEX INSULATION

DISTRIBUTION TRANSFORMERS

NETWORK TRANSFORMERS

MEDIUM TRANSFORMERS

General Electric's new rating method gives you higher kva ratings, with full operating life, at no extra cost.

GENERAL ELECTRIC

Using General Electric's new transformer rating method, you utilize

Greater kva capacity with Permalex* insulation

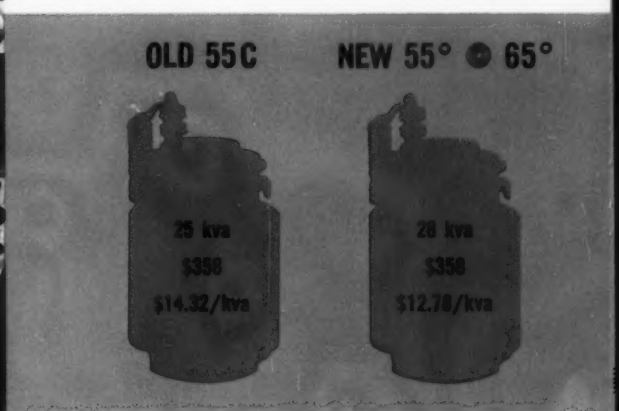
Permalex insulation was developed in G-E laboratories, and reported to the industry in AIEE paper TP-60-58 over a year ago. But standard rating systems have not permitted some users to fully realize the benefits of this outstanding insulation system — until today.

Now General Electric announces a NEW method of rating transformers, specifically designed to let you take maximum advantage of the higher kva capacity possible with Permalex insulation.

An additional higher kva rating now appears on G-E oil-filled distribution and network transformers.

*Trademark of General Electric Company

GENERAL ELECTRIC'S PERMALEX insulation gives you more kva — at lower cost-per-kva. Photo at left shows new 55° ● 65° label which identifies G. E.'s new dual-kva distribution transformer.



For example — a transformer formerly rated 25 kva is now rated 25/28 kva — indicating that you get the full benefits of a 28 kva unit from a General Electric transformer ASA-rated at 25 kva.

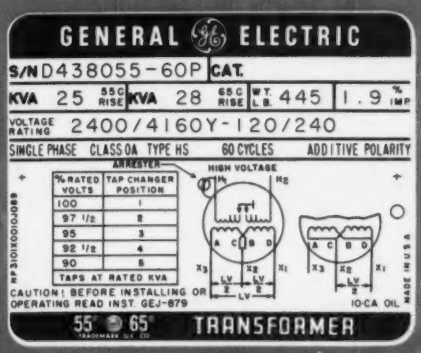
The nameplate is labeled 55° ● 65° to show the corresponding average winding rises associated with these two kva ratings. Here are sample ratings: 50 kva is now 50/56; 250 kva is now 250/280; and 750 kva is now 750/840 kva. Permalex insulation enables you to base your transformer utilization on the higher load and temperature with no sacrifice in transformer life.

Using the new higher kva rating, you can now apply the full benefits of Permalex insulation *according to your established loading practices.* Since you get more kva capacity at no price premium, you can realize substantial savings on cost-per-kva.

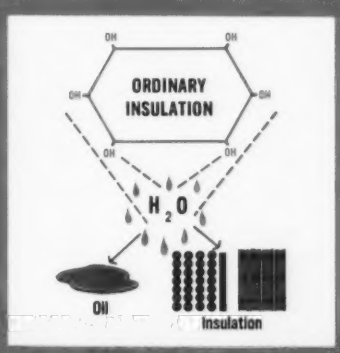
Your General Electric Sales Engineer can give you a dollars-and-cents breakdown of the actual savings *you* can get. Contact him today, or write for bulletin GEA-7047 to Section 482-05, General Electric Company, Schenectady 5, New York.

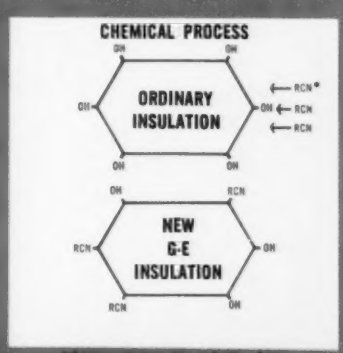
GENERAL ELECTRIC

NEW NAMEPLATE shows ASA standard 55C rise kva rating, plus General Electric's new kva rating based on 65C rise — made possible by Permalex insulation.



HERE'S WHY Permalex insulation allows transformer operation at 65C winding rise. Chemically modified insulation in G-E Permalex system drastically reduces formation of water which attacks turn and layer insulation in ordinary systems.





FULL-VALUE
CERTIFIED
TRANSFORMER
GENERAL ELECTRIC

- Superior design, features, and performance
- Faster shipment
- Complete service

HERE ARE THE NEW RATINGS

	55C Self-Cooled	65C Self-Cooled	65C Fan-Cooled
1φ	833 kva	933 kva	1073 kva
	1250 kva	1400 kva	1610 kva
	1667 kva	1867 kva	2147 kva
	2500 kva	2800 kva	3500 kva
	3333 kva	3733 kva	4666 kva
	5000 kva	5600 kva	7000 kva
3φ	750 kva	840 kva	966 kva
	1000 kva	1120 kva	1288 kva
	1500 kva	1680 kva	1932 kva
	2000 kva	2240 kva	2576 kva
	2500 kva	2800 kva	3500 kva
	3750 kva	4200 kva	5250 kva
	5000 kva	5600 kva	7000 kva
	7500 kva	8400 kva	10500 kva

Permalex insulation now used in G-E medium transformers

General Electric now extends the use of Permalex insulation to medium transformers to give you 12 percent higher kva with continuous operation at 65C rise. You get this bonus kva at no price premium — and with no loss in transformer life expectancy.

For example — a G-E medium transformer with Permalex insulation, formerly rated by ASA at 5000 kva, 55C rise, can now be operated at 65C rise and 5600 kva with normal life. If you operate the transformer at ASA rating you get five times longer life. In addition, standard fan-cooled rating increments can be applied at 65C rise operation.

Your General Electric Sales Engineer has specific information on the savings you can realize with the new higher kva ratings — another Certified Full-value feature of General Electric medium transformers. Give him a call, or write for detailed information to Section 482-05A, General Electric Company, Schenectady 5, New York.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Mono-rail Moves Concrete for Footings

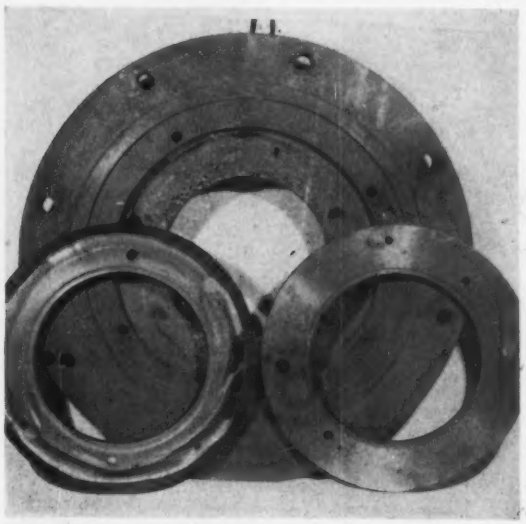
PHILIP C. EVANS, B. C. Engineering Co, Vancouver, B. C.

A mono-rail transporter solved the problem of moving concrete over soggy terrain to tower locations for a 230-kv double-circuit line of British Columbia Electric Co. The steel tower line traverses several miles of the Fraser River delta, where the clay bed is covered by peat moss many feet deep in places. Design of the tower footings called for driving 30 to 40-ft wooden piles and then capping each pile assembly with reinforced concrete. Quantities of concrete ranged up to 72 yd at the heavier tower sites.

To meet specifications for a uniformly good quality of concrete, the footing contractor chose to use ready-mix, which could be hauled along the highway paralleling the line. The problem remained to transport the concrete rapidly and economically across the 1,000 ft of peat bog.

A British-manufactured mono-rail transporter provided a satisfactory solution. The rail can be set over trenches, streams, muskeg, or on pontoons over water without expensive bridging. Two men can easily carry the 12-ft lengths and connect 1,000 ft of track in half a day. The skip, with a capacity for about ½ yd of wet concrete, is driven by a 4½-hp gas engine at 300 fpm. No driver is required between loading and discharge points—an automatic stop functions at the end of each run.

Wear Plates Cut Ash Pump Repair Cost



MILD STEEL WEAR PLATE is installed in the end bell of an ash pump instead of replacing the entire casting

R. G. ELLIS, Maintenance Foreman, Muskingum River Plant, Ohio Power Co, Beverly, Ohio

Replaceable wear plates are saving almost $17,000 per year in maintaining the end bells on 14 ash pumps at Muskingum River Plant. Formerly, when abrasive ash wore down these 37½-in. dia, 940-lb end bells, the entire casting was replaced. Each casting lasted only three months.

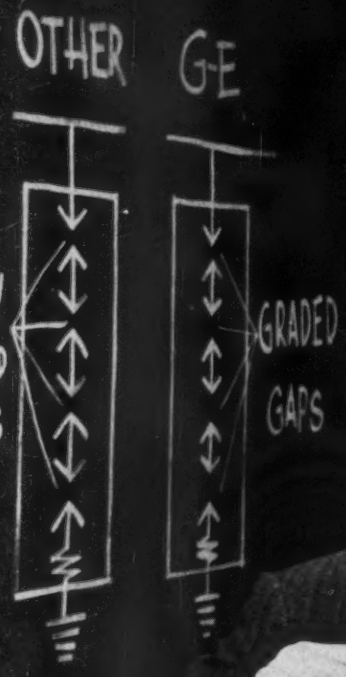
Now, after the ash cuts into the suction-side end bell, it is removed, machined out, and a mild steel wear plate is installed. First installations cost $110, including labor for machining; subsequent ones cost $75, instead of about $464 for an entire casting.

For longer wear, castings of Ni-Hard and Meehanite materials and also abrasion-resistant steel have been tried. So far the Ni-Hard cast plates have proved best, lasting at least a year or more before requiring replacement. Tidd Plant of Ohio Power Co also reports the use of Ni-Hard wear plates on ash pump end bells.

(*More Methods on page* 58)

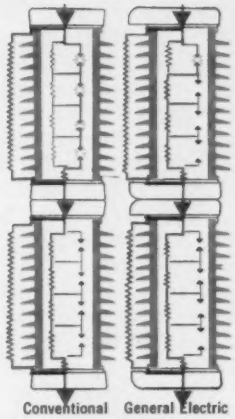
WHEN CONTAMINANTS COLLECT ON PORCELAIN, HERE'S...

How General Electric's anti-contamination feature protects your arrester investment



Obtain system-wide protection with General Electric Magne-valve arresters

Most contaminants that adhere to an arrester are electrically non-conducting when dry. Alternate wetting and drying of these contaminants cause varying degrees of resistance over the outside of the arrester—resulting in uneven 60-cycle voltage distribution. Sparkover begins—on conventional arresters—when built-up power voltage causes sparkover of all gaps in the overstressed unit. Line-to-ground power voltage is then redistributed to the remaining units . . . and a chain reaction of successive sparkovers could lead to arrester destruction.



Magne-valve* station class arresters overcome this problem with graded gap spacings. When contamination causes the voltage to sparkover the smallest gap, the others—having greater spacing—remain in service. The unit's resistance then more nearly matches the others, restoring uniform voltage distribution.

Hence, G-E station-class arresters are self-protected from contamination's effects—up to the point of external line-to-ground flashover.

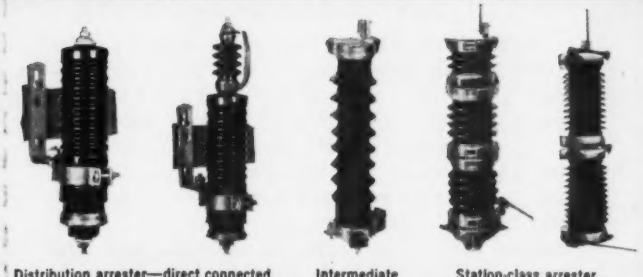
See your General Electric Sales Engineer for the complete details about graded-gap design on General Electric Magne-valve Arresters. Use the coupon below for a free booklet of industry standard certified test data, on General Electric magne-valve lightning arresters.

*Combines magnetic gap action with Thyrite® valve action.

Don Herbert explains how the exclusive design of G-E station class arresters combats the effect of external contamination.

Progress Is Our Most Important Product

GENERAL ELECTRIC



Distribution arrester—direct connected and externally gapped 3–20 KV

Intermediate 3–121 kva

Station-class arrester Form 3K

Form 1H

Section A488-02, General Electric Company
Schenectady 5, New York

Please send me a copy of certified design test data for the following General Electric Magne-valve lightning arresters.

- ☐ Distribution (GET-3035)
- ☐ Intermediate, Form 2H, (GET-3036)
- ☐ Station class, Form 1H (GET-3037)
- ☐ Station class, Form 3K (GET-3033)

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

Dishwasher Speeds Cleaning of Insulators

GEORGE K. MERZ, Portland General Electric Co, Portland, Ore.

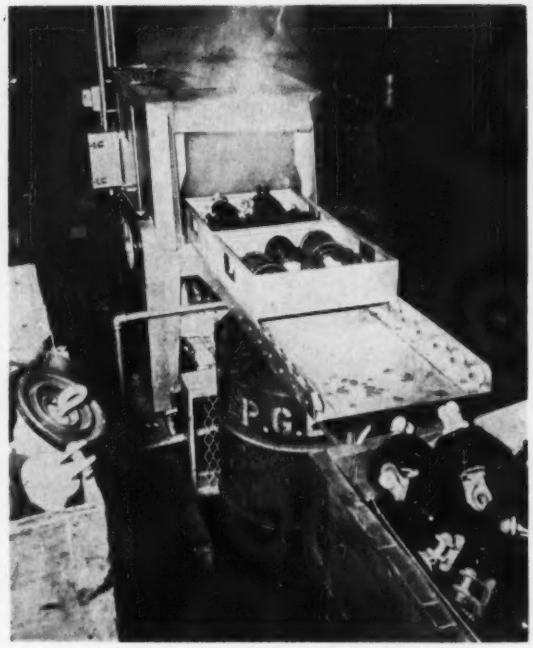
With a commercial dishwasher modified to clean contaminated insulators removed from service, Portland General Electric Co is saving at least 3,000 man-hr a year in labor costs. Full size bell strings of 10-in. suspension insulators can be washed in the unit without disassembly. Small insulators are put through by the hundreds with no labor involved except for loading and unloading trays.

The former washing method included soaking in detergent solutions and scrubbing on a specially designed power-driven bristle brush. However, dirty insulators began piling up in the salvage section. Faced with the need for additional help or a more rapid cleaning method, the company considered converting a commercial dishwashed for the job.

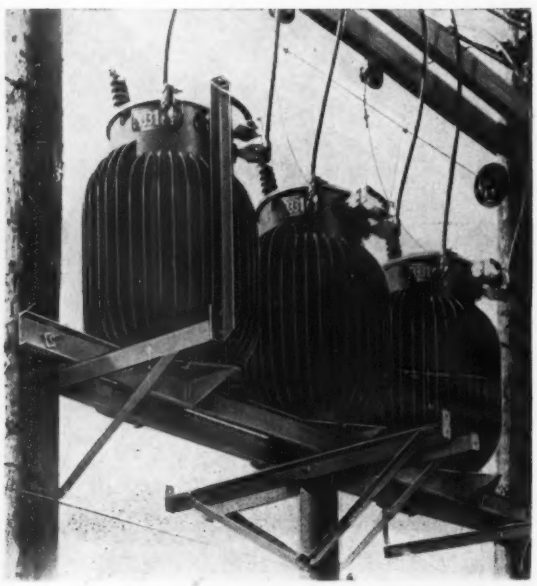
Although new units cost from $2,000 to $2,500, a used dishwasher was purchased for $150. The unit is basically a 20-in. square housing 4 ft long, with a 40-gal heated wash-water reservoir connected to a pump and then to slotted distributor tubes, a rinse water distributor pipe and a combination link-belt chain drive and pump motor.

Modifications made to the dishwasher for insulator washing included:

- Galvanized iron trays with expanded metal bottoms made to take the heaviest insulators.
- Entrance and exit tables arranged so that trays could be loaded and rolled on nylon rollers into and out of the washer without assistance.
- Washing time increased from 20 sec to 200 sec by changing the gear train. Trays follow one another so that a continuous flow of clean insulators is discharged once the machine is started.
- Rinse nozzles modified to provide better water distribution with less volume. Clean hot water is used in this section and discharged by gravity to the sewer.



The backlog of work has been removed completely and the operator has considerable time for other duties. Cleaning cost is extremely small per insulator due to the volume handled.



Place 333-Kva Units On Rack for 100-Kva Distribution Transformers

Houston Lighting & Power Co replaced three 100-kva units with three 333-kva, 7.2-kv distribution transformers to avoid the need for additional space on which to build a ground-type substation.

The larger transformers were placed on the existing 14-ft rack in the alley behind the customer's plant. It was not necessary to modify the rack in any way because each 333-kva unit is about 35 in. in diameter and 57 in. high. In addition, each unit weighs less than 2,200 lb, which is about the weight of older 167-kva distribution transformers.

ALLIS-CHALMERS

No space problem here!

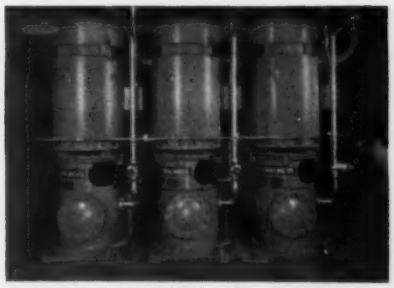
Another utility installs an Allis-Chalmers surface condenser

Illinois Power Company installed an Allis-Chalmers 125,000-sq-ft, two-pass, divided water box surface condenser at its Hennepin Station (Unit 2). Improved design resulted in space saving and reduced installation costs.

A-C special cars carried unit in just three shell sections to simplify shipping, speed on-site handling and minimize erection. Extra-compact rectangular condenser shape reduced space requirements. And Allis-Chalmers unique reverse flow design for cooling water effectively back-washes debris, ends costly shutdown, conserves space, requires no additional piping.

For details on compact A-C condensers from 100 to 200,000 sq ft and larger, call your nearby A-C office or write ***Allis-Chalmers,*** *Power Equipment Division, Milwaukee 1, Wisconsin.*

Allis-Chalmers circulating pumps with vaned elbows allow use of smaller inlet tunnels and permit adjacent pumps to be located closer together. Result, considerable saving in overall space requirements.



Allis-Chalmers vertical condensate pumps also save space. With the first stage impeller located below floor level, the required NPSH can be gained in the pump tank. This feature permits a shallower basement.

A-1274

Procurement & Products

MEETING ▸ **Ways of improving purchasing and stores performance** is the main theme of the 13th Annual Meeting of the EEI Purchasing and Stores Committee opening in Philadelphia today. One of the highlights will be a workshop session under the title "Stores Performance Measurement—a search for yardsticks and other benefits" to be held under the guidance of S. L. Koslow, Long Island Lighting Co.

Other topics to be covered at the two-day meeting include stores employee training, organization, application of open-end purchase orders, disposal of surplus and obsolete material, trends in inventory procedure, and computer applications.

PRICES ▸ **Simplified method of pricing high voltage power capacitor banks** for distribution, subtransmission, and transmisson use has been worked out by General Electrc Co. Called the "straight line" method, it consists simply of multiplying the bank kvars for any voltage class from 4 kv to 230 kv by $2.40 net per kvar, which is the company's price per kvar for ungrounded wye banks with standard voltages. To this must be added the prices for base insulators or substructures, if required. Prices for these items are contained in lists now being distributed to utility customers.

FLEETS ▸ **Fleet leasing gains.** Recent survey by The Dartnell Corp of Chicago shows that of the 650 companies (industrial, commercial, and utility) responding to a recent questionnaire, 37% now lease cars and light service vehicles for business use. In 1956 the figure was 25%, and in 1952, only 14%. Capital freed for other corporate purposes is the reason most often cited for the change. Fewer administrative headaches and improved employee morale are also factors that turn up often in this survey.

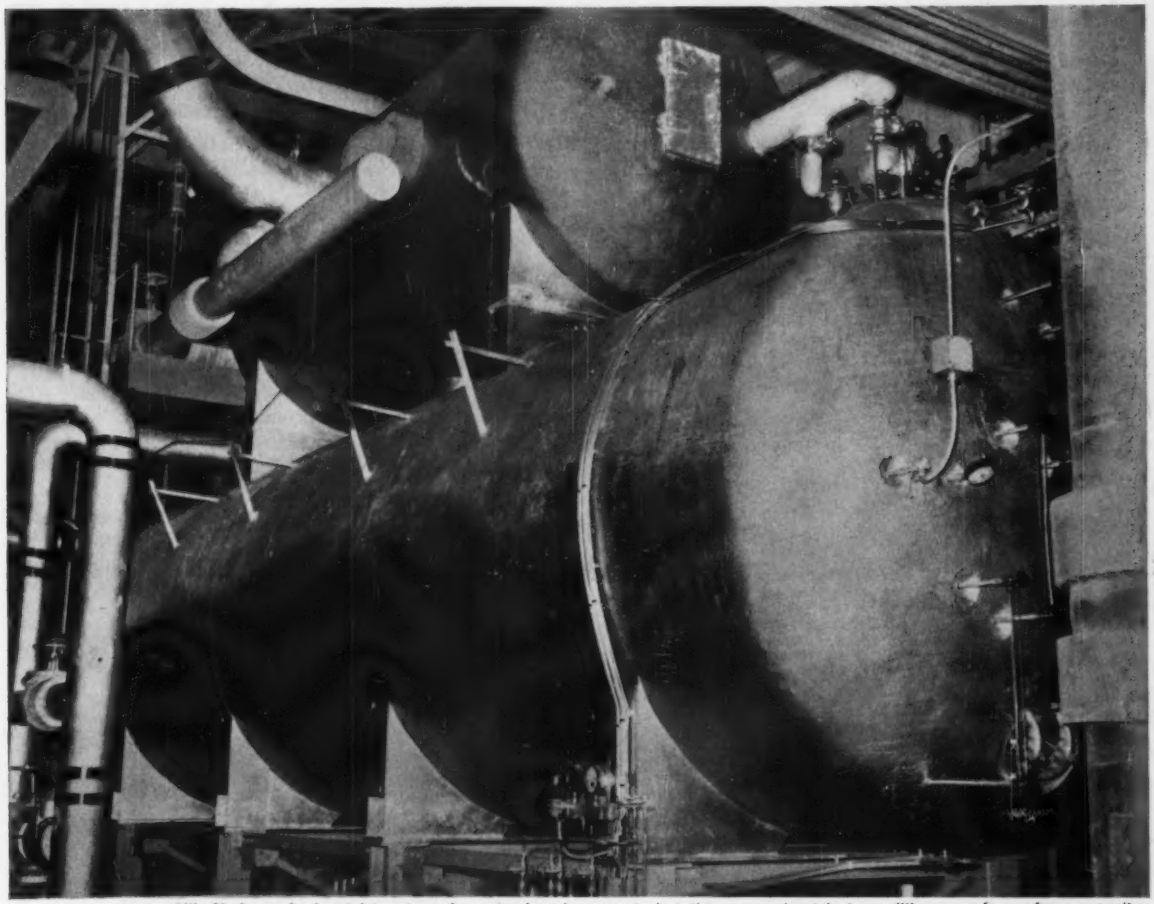
Most fleet managers agree, says the survey, that leasing's advantages show up best if your average annual mileage figure is high—15,000 miles or more. One expert reports that a leased car in his company doesn't pay until it has been driven to 20,000 miles in any given year. The survey also noted that car air-conditioning is gaining—hitting an annual sales rate of 400,000 units last year. Units are said to be a real boost for morale of salesmen, servicemen, and executives.

COMMUNICATION ▸ **PA's on the phone.** Largest single business use of long distance telephoning is order placement by purchasing departments, according to an American Telephone and Telegraph Co study. Fourth largest single use (in terms of the number of calls placed) is inquiry placement by purchasing departments.

READING ▸ **You'll want to read** the editorial, "Judgments Will Call for Insight," second in a series on the antitrust cases (p 31) and the special report, "Fleets on the Move . . ." beginning on page 43.

ALLIS-CHALMERS

A-1221



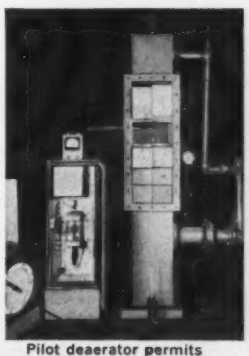
Allis-Chalmers horizontal tray-type deaerator in a large central station, approximately two million pounds per hour capacity.

Iron and Copper pick-up minimized

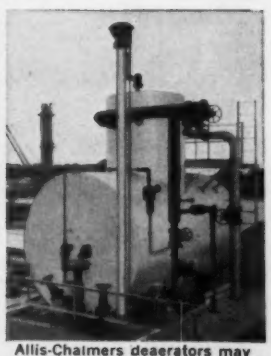
when you switch to Allis-Chalmers deaerators

Positive corrosive gas removal by Allis-Chalmers tray-type deaerators is proved by a pilot unit (below) equipped with a continuous oxygen analyzer and recorder. It utilizes unique counterflow design for thoroughly scrubbing dissolved gases from the water surface. Design produces maximum heating of water with minimum of steam loss in venting. Effective deaeration is guaranteed under all loads, minimizing iron and copper pick-up.

Ruggedly constructed, A-C deaerators employ 16-gauge 18-8 stainless steel on all equipment exposed to corrosive gases. No moving parts assures quiet operation, minimum maintenance. Inspection is easy through ample access doors and manholes. Service? Seventy-seven district offices throughout the nation. Your A-C water conditioning engineer can give you full deaerator details. **Allis-Chalmers,** Power Equipment Division, Milwaukee 1, Wisconsin.

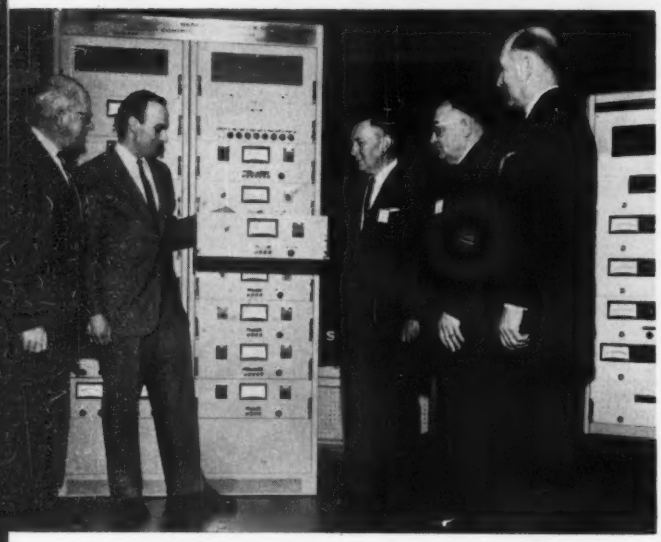


Pilot deaerator permits evaluation of tray designs.



Allis-Chalmers deaerators may be installed indoors or outdoors.

Stromberg-Carlson Ships Fermi Control System



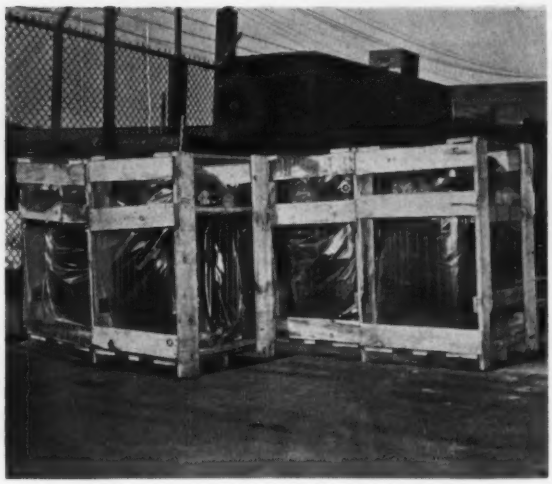
Completely transistorized instrumentation and control system for Enrico Fermi atomic power plant is shown (left) to Rochester Gas & Electric officials by the manufacturer, Stromberg-Carlson Div of General Dynamics Corp, Rochester, just before shipment.

This is the first such unit Stromberg-Carlson has supplied for an application of this sort, although it has built similar systems for naval and military reactors. RG&E is one of the 14 utilities participating in Power Reactor Development Co, which is building the 150-Mw Fermi reactor.

Gordon C. Hoit, senior vice president, Stromberg-Carlson, and Chester Clarridge, project engineer (left to right) check out the system with RG&E's Leo H. East, executive vice president, (center), Ralph H. McCumber, and Linn B. Bowman, RG&E vice presidents.

Principal features of the system are construction in relatively small plug-in modules, making maintenance easier and quicker, and its ability to check its own operation and signal an alarm if a malfunction develops.

Polyethylene Film Covers Designed for Transformers



Polyethylene film covers for these transformers (right), shipped and stored in wooden pallets, were recently designed and fabricated by Canton Containers, Inc, Canton, Ohio, for General Electric.

The covers lock out moisture, dust and dirt otherwise encountered as a problem in connection with palletized shipments. The manufacturer can save warehouse space, storing transformers outside.

Canton says that lately it has observed a noticeable influx of orders from the electrical products industry for polyethylene covers and packing of all types of electrical equipment, ranging from large transformers to minute electronic components.

L-M Raises Transformer Ratings

Line Material Industries announced on April 21 that ratings are increased on all its Issue E Round-Wound distribution transformers rated through 75 kva, 2,400 through 8,000 v. A. R. Waehner, director of transformer sales, said the rating boosts with normal life expectancies were made possible without any design changes by the thermal characteristics of Round-Wound transformers.

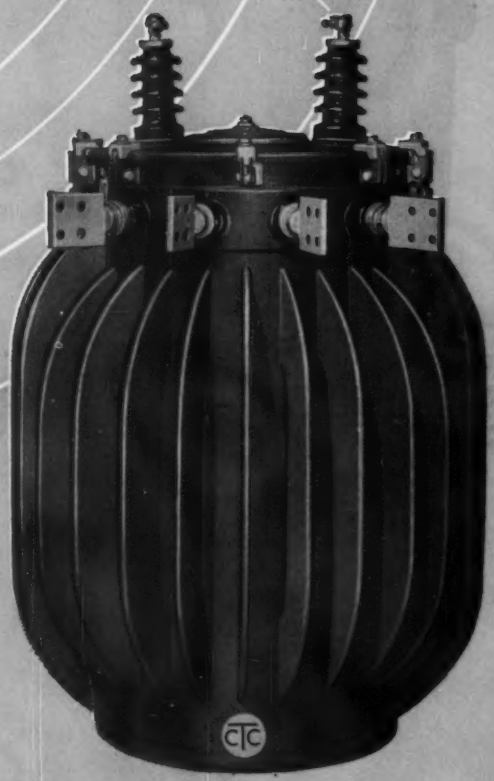
Ratings of 5, 10, 15, and 25 kva have been increased 20% to 6, 12, 18, and 30 kva, respectively. Ratings of 37.5, 50, and 75 kva have been hiked 12% to 42, 56, and 84 kva, respectively.

Transformers operating at these higher rated loads will not exceed the present ASA hot-spot temperature rise limit of 65C.

"These new ratings," Waehner said, "extend to all L-M transformers conforming to Issue E design. Thus, present users can automatically uprate their units with assurance of normal life expectancy." Units are identified on their nameplates. L-M is investigating the uprating of larger transformers.

(*More News of Manufacturers, p* 66)

...Means ECONOMY!



A Central transformer represents high quality at LOW COST! Why? Because we manufacture only ONE product—transformers.

Our entire operation is geared to the efficient production of this one product. Many who have visited our plant marvel at the degree of automation which has been achieved in the various stages of the production process. ALL are impressed by the skill displayed by our experienced craftsmen.

This combination of automation and skilled craftsmanship results in a high degree of efficiency in overall operation which, in turn, results in generally lower production costs. These savings are passed on to you, our customers! For LOW Initial Cost, LOW Operating Cost and LOW Maintenance Cost—Buy CENTRAL!

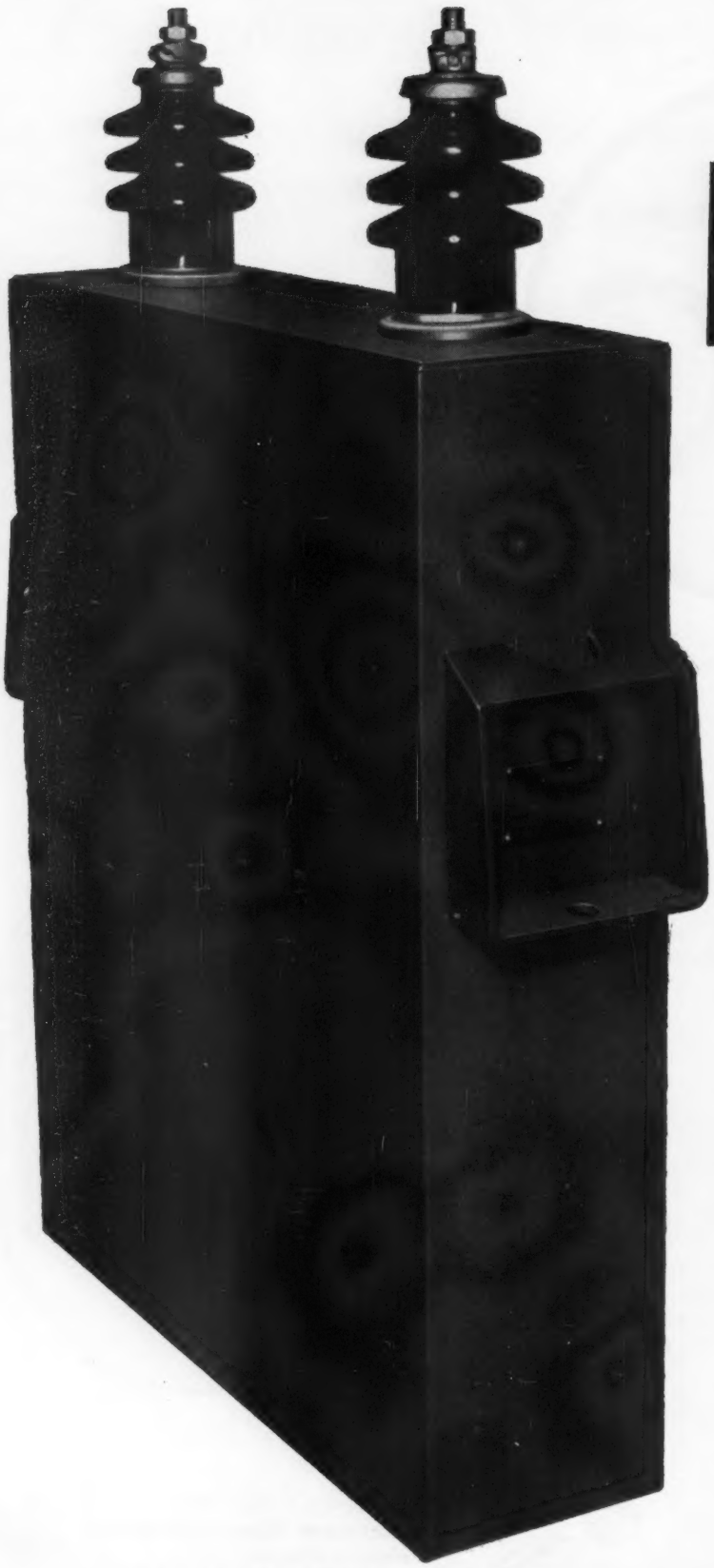
CENTRAL

Sales Offices in Principal Cities

Transformer Corporation

Telephone JEfferson 4-5332

PINE BLUFF, ARKANSAS



New...

100-KVAR CAPACITOR

...doubles capacity in pole-top installations

Westinghouse Electric Corporation's more than two years of pioneering experience in 100-kvar capacitor development have paid off in a unit which is 28% lighter. Over-all volume has been cut by 25%—1000 cubic inches!

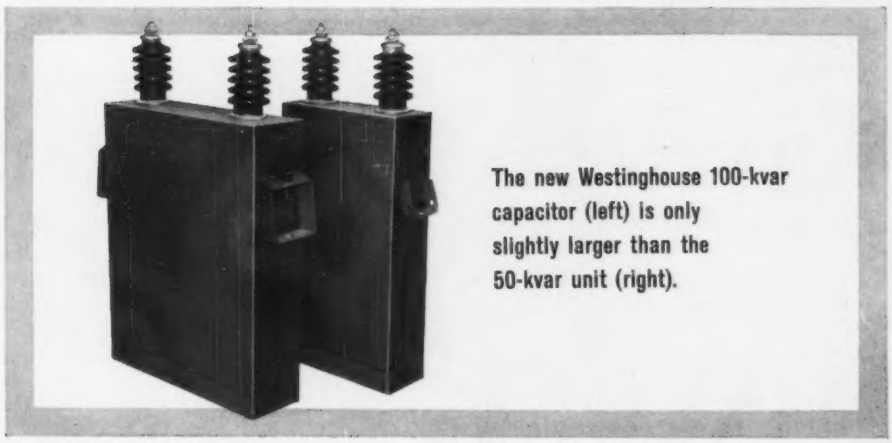
As an example of the economies resulting from this product of Westinghouse research and development, a 1200-kvar Autotrol* with 100-kvar capacitors now occupies no more pole space than a 600-kvar Autotrol with 50-kvar units. Size and weight reductions like these promise proportionate advantages not only in complete Autotrols, but also in stack-type equipments, and mean greater efficiencies and dollar savings for you.

Let us show you how these savings can apply to your system. Call your Westinghouse representative, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa.

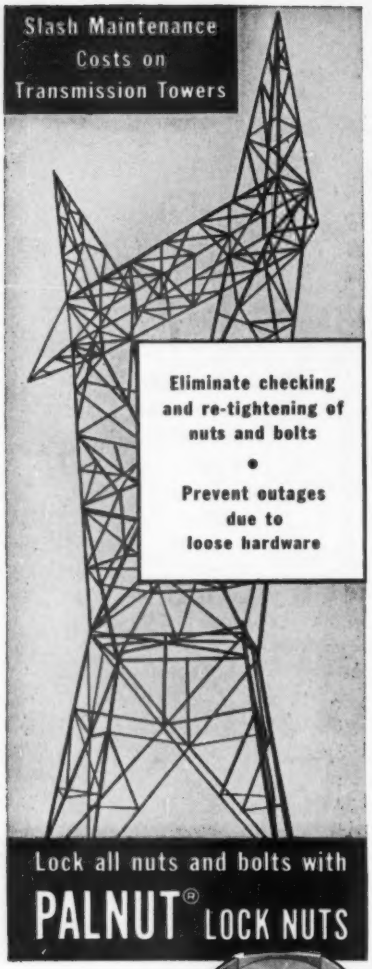
*Trade-Mark J-60995

YOU CAN BE SURE...IF IT'S

Westinghouse



The new Westinghouse 100-kvar capacitor (left) is only slightly larger than the 50-kvar unit (right).


Slash Maintenance Costs on Transmission Towers
Eliminate checking and re-tightening of nuts and bolts
•
Prevent outages due to loose hardware
Lock all nuts and bolts with
PALNUT® LOCK NUTS

Applied in seconds— Stay tight for life

PALNUT Lock Nuts are the lowest-cost, most reliable method of assuring permanently tight tower bolts, for these reasons:

- **Vibration-proof.** Unfailing double-locking spring action holds assemblies to original tightness.
- **Easy, fast assembly.** Light in weight, easily carried, free-spinning, quickly lock with ¼ to ½ turn of linesmen's wrench.
- **Weatherproof.** Heavily galvanized to equal or exceed ASTM specs. Still perfect after 30 years' service on many towers.
- **Low cost.** PALNUTS cost a trifle more than one cent in average sizes.
- **Small Space.** Need only 3 bolt threads.

Specify PALNUTS on all new towers —add them to existing towers. Send for Free Samples and data

THE PALNUT COMPANY
Division of United-Carr Fastener Corp.
51 Glen Road Mountainside, N. J.

TVA Awards Second 650-Mw Unit to GE

Tennessee Valley Authority announced last week that it has placed an order with General Electric Co for a second 650-Mw turbine-generator for its Paradise plant in western Tennessee. The second, like the first, is a 3,600/1,000-rpm cross-compound machine using steam at 2,400 psi, 1050/1,000F and having a guaranteed capability rating of 650 Mw at 3-in. Hg back pressure and 3% makeup with generator hydrogen pressure of 30 psi.

Price of the initial TVA machine was $18 million. Price of the second is $16,250,000. The lower price reflects prices announced by GE last October.

Initial announcement of the first TVA machine gave its rating as 600 Mw. Subsequently the rating of the machine was increased to 650 Mw to take full advantage of capability inherent in its design under operating conditions TVA will have.

Last July at the time it ordered the first unit, TVA also obtained an option on three more identical units, of which the present order is the first. TVA has an option with GE for two more 650-Mw units.

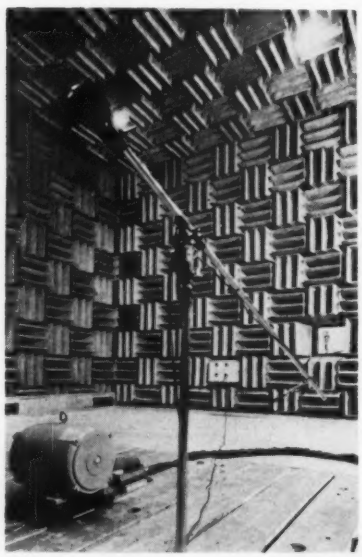
At the same time that it placed this order TVA also ordered from Babcock and Wilcox a second identical boiler for Paradise station. These boilers will deliver 4,750,000 lb of steam per hr at 2,450 psi, 1,050/1,000 F. The original boiler was $14,495,620 and the duplicate unit, $13,836,256.

Alco Head Discusses Outlook for Capital Goods

General improvement which was predicted in the demand for capital goods has not as yet begun to materialize, in the opinion of Alco Products' Board Chairman Perry T. Egbert. At the company's annual meeting on April 19, he said the improvement expected by early 1960 had not taken form for Alco and other heavy-goods producers.

"Although many other segments of the economy," he said, "have recovered from the steel strike and the 1958 recession, the upswing in the capital goods industry now looks like a very gradual one—probably beginning later this year."

In discussing foreign competition and its effects on American markets, he said, "We must tighten up economically in every way. We must invest capital to procure more efficient machines which will cut costs. We must control inflation so that we may compete on prices . . . American industry is pricing itself out of foreign markets."



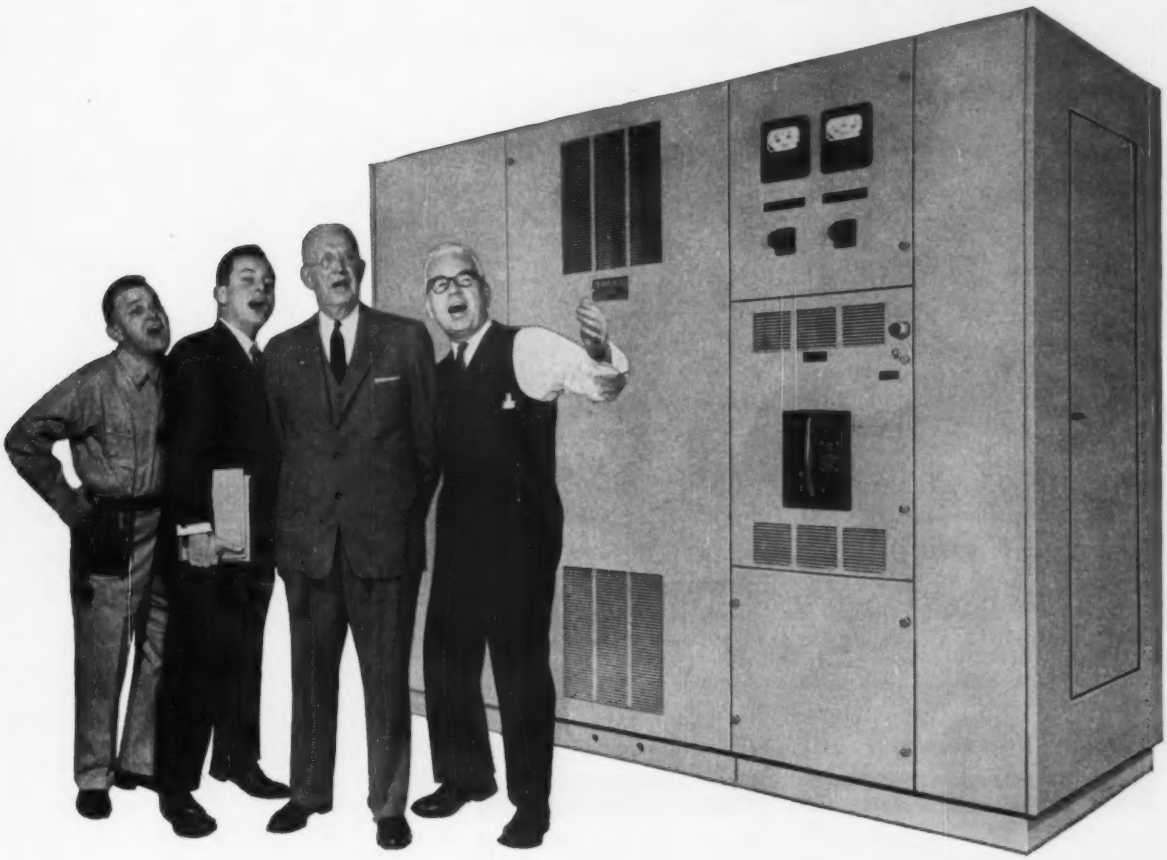
Test Chamber Designed

Semi-anechoic chamber to test vibration and noise of motors through 1,500 hp (left) has been built by Westinghouse Electric's motor department, Buffalo, N. Y. The 30x30x18-ft room is also equipped with basic instruments and accessories to measure and record sound pressure and vibration data down to extremely low values.

Fiberglass wedges absorb energy for all the frequency components above 100 cps. Above this frequency, walls and ceiling become non-reflecting surfaces. This insures highly accurate measurements on the radiated noise from the motor under test.

(*More Manufacturers News, p* 70)

"WE BOUGHT THE I-T-E TRANFO-UNIT® BECAUSE..."



The TRANFO-UNIT is a complete, self-contained unit substation in a single package. It includes the primary disconnect, transformer, and secondary circuit protective devices.

"So easy to install. There's no complicated assembly at the site. You just position the TRANFO-UNIT and connect."

"Neat, attractive appearance. No hodge-podge arrangement of assorted gear. Saves space too. A real asset for any building."

"Greater safety. Everything is inside the TRANFO-UNIT. No exposed hot parts. It needs no fence."

"Better regulation. We put a TRANFO-UNIT in every load area. So we get better voltage regulation for all our lights and equipment."

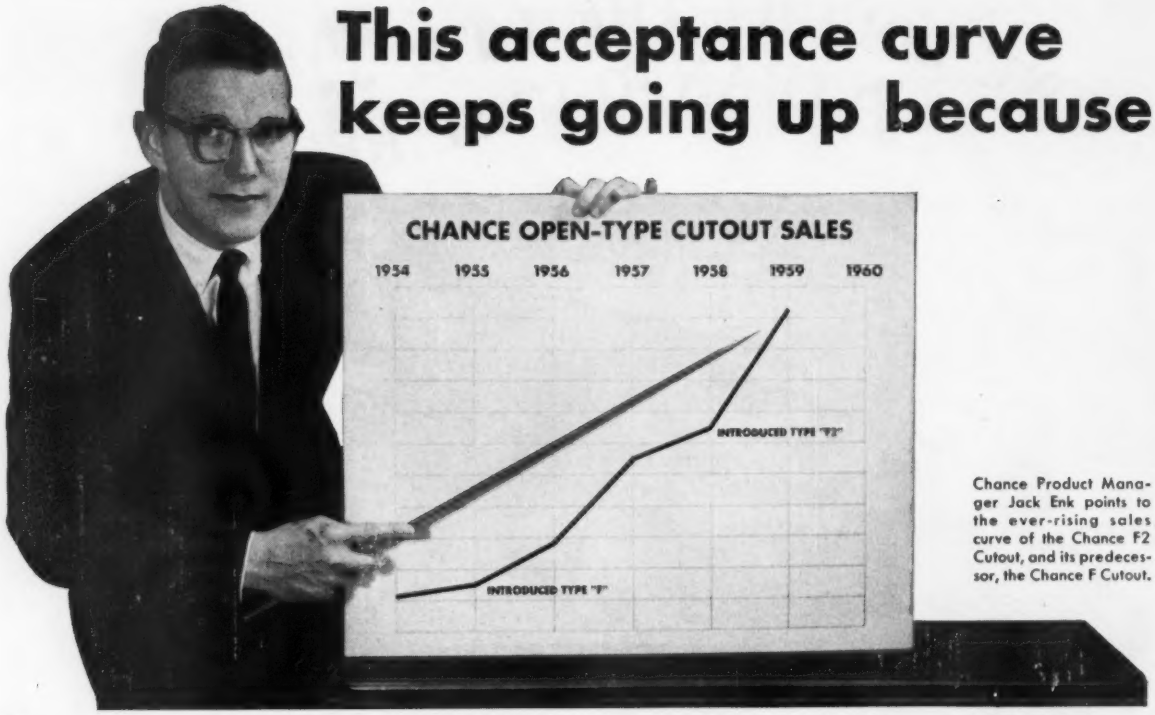
"Economy. We buy our power at economical higher voltages. Then we put the TRANFO-UNIT right near the load. Cables can be smaller size, lower cost."

"Flexibility. I-T-E gives us complete custom design service. TRANFO-UNIT components can be selected to meet our particular requirements."

For supermarkets, schools, office buildings, factories and many other applications, the I-T-E TRANFO-UNIT is ideal. Available from 45 through 2500 kva. For complete information, write I-T-E Circuit Breaker Company, Dept. TR, 1900 Hamilton St., Philadelphia 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY

This acceptance curve keeps going up because . .



Chance Product Manager Jack Enk points to the ever-rising sales curve of the Chance F2 Cutout, and its predecessor, the Chance F Cutout.

Product acceptance to help you buy with confidence

More and more Chance F2 Cutouts appear on power lines across the country every day. Utilities are buying these cutouts because they have proven to themselves that the F2 will protect their systems from *any* fault—HIGH, MEDIUM, or LOW (and points between). They also know that the F2 will provide the higher interrupting capacities tomorrow's systems may require.

44% of these major utilities accept and use the F2

Here Are Net Incomes for 144 Operating Electric Utilities*

Utilities from coast-to-coast, impressed with the ruggedness and full range effectiveness of the F2, have written it into their standards. These utilities are sold on the F2's ability to protect their systems against high, medium or low fault currents. Some of the utilities on this list published in *Electrical World* have more than 10,000 Chance cutouts in service. That's real product acceptance!

You can buy F2 Cutouts with confidence, sure that you're getting these advanced features so important for the protection you need:

- EXPENDABLE CAP assures wide-range operation on *any* fault. A small disc in the cap is ripped off on high fault currents, permitting the double-venting required to hold shock and strain to a minimum. On low and medium faults, the disc stays in place. By keeping the gases under the cap, the F2 single-vents to give protection against these lower faults.
- FUSE LINK EJECTOR makes doubly sure the cutout operates on low fault currents. Teamed with a small-bore fusetube, it assures low fault current interruption. Vitally important to load-break operation.
- POSITIVE LATCH holds fuseholder with a "bulldog grip"... keeps the cutout from opening under vibration or impact. Even if the fuselink is not installed tightly (or slips or stretches after installation), the fuseholder will not drop out. The latch cannot be welded shut because it is not a primary current-carrying element.
- ALL-BRONZE SLEET HOODS at both ends completely protect vital contact areas under all weather conditions. These all-bronze sleet hoods, and extensive use of copper alloy in the F2, guarantee trouble-free, peak performance, even in the most contaminated atmosphere.

  The F2, in voltages of 5.2, 7.8, 15 and 27 KV, and in 100 and 200 ampere ratings with interrupting capacities as high as 12,000 amps, are available from local stocks.

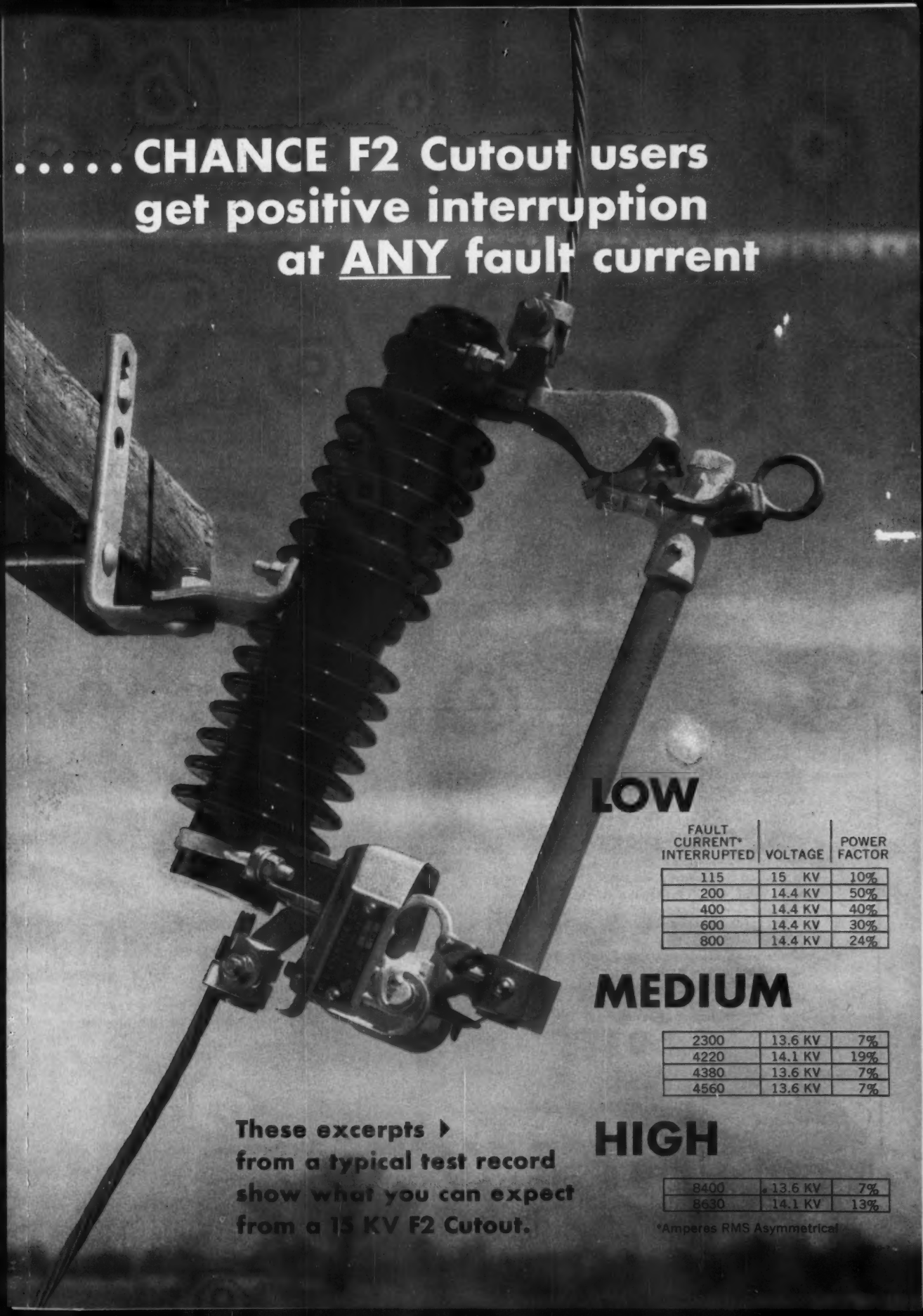
CHANCE F2 CUTOUTS ARE ALSO AVAILABLE IN COMBINATION WITH LIGHTNING ARRESTERS

A. B. CHANCE CO.

CENTRALIA, MISSOURI

(A. B. Chance Company of Canada, Ltd., Toronto)

.....CHANCE F2 Cutout users get positive interruption at ANY fault current



LOW

FAULT CURRENT* INTERRUPTED	VOLTAGE	POWER FACTOR
115	15 KV	10%
200	14.4 KV	50%
400	14.4 KV	40%
600	14.4 KV	30%
800	14.4 KV	24%

MEDIUM

2300	13.6 KV	7%
4220	14.1 KV	19%
4380	13.6 KV	7%
4560	13.6 KV	7%

HIGH

8400	13.6 KV	7%
8630	14.1 KV	13%

*Amperes RMS Asymmetrical

These excerpts ▸ from a typical test record show what you can expect from a 15 KV F2 Cutout.

By any yardstick . . .

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QUALITY

OF

SUPERIOR

FIGURE 8

Pole & Bracket Cable

meets the test!

Measure quality any way you like, you'll find that SUPERIOR Figure 8 Pole and Bracket Cable for multiple systems is tops!

Insulated with the highest quality polyvinyl chloride, SUPERIOR'S Figure 8 Cable does not deteriorate with age or weather, will not support combustion, is not affected by common chemicals or electrolysis and maintains its high insulation resistance when wet.

More than that . . . it is tough and highly resistant to abrasion and mechanical damage, yet is flexible and strips clean which speeds installation.

Available with 10 AWG solid copper or aluminum conductors, overall diameter .20 x .396; 8 AWG stranded copper conductors, overall diameter .28 x .560; 8 AWG solid aluminum conductors, overall diameter .28 x .560. Standard reel length is 2500 feet.

For performance and economy . . . top quality SUPERIOR Figure 8 Pole and Bracket Cable is your buy for multiple systems!

For complete information and prices, write

SUPERIOR CABLE

SUPERIOR CABLE CORPORATION

Hickory, North Carolina

4709

Russia Leads World in Solid-State Research: Dr Suits

"Based on the number of published scientific articles, the Soviet Union now leads the world in research effort in the important fields of solid-state science," according to Dr Guy Suits, General Electric vice president and director of research.

General purpose of solid-state research, he pointed out in a speech recently, is to investigate basic properties of both metals and non-metals to find out how their structure affects their strength, how they react, and how they provide the vital function of semi-conduction. "Increased knowledge in these areas could lead to stronger materials, more reliable communications and special energy systems."

Growth of the U.S. semiconductor products industry was labeled by Dr Suits as "phenomenal," doubling every year for the past ten years. The transistor and other solid-state devices have made development of unique new products possible. Still newer devices like the tunnel diode, he said, are certain to lead to newer industrial and military products and systems.

"Thus," he observed, "solid-state research is of major importance to the economy and to the national defense."

He predicted that the new energy systems (thermoelectricity, fuel cells, thermionic converters, magneto-hydrodynamic generators, fission and fusion) may find application in various combinations with each other and with established energy systems.

Allis-Chalmers Expands

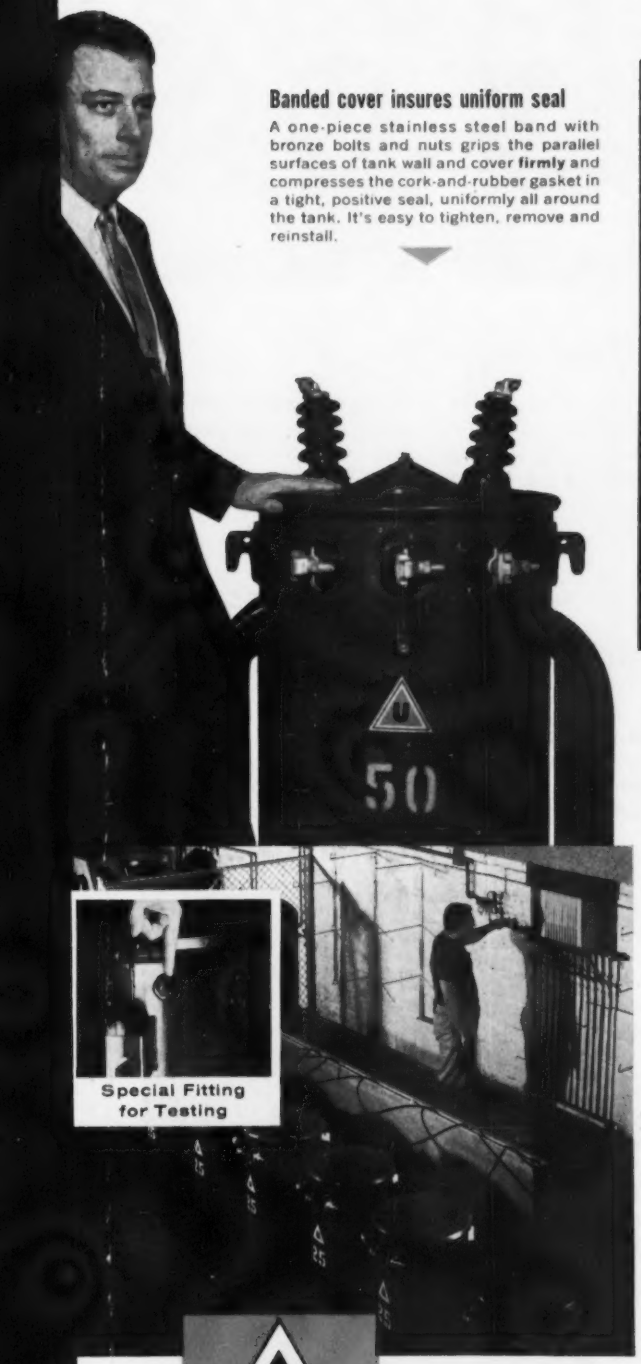
Allis-Chalmers will construct a multi-million-dollar engine manufacturing plant at its Harvey, Ill., works, near the site of a recently completed engineering development and research laboratory. A broad line of diesel, natural gas, butane and gasoline engines will be built there, to power products sold by A-C in the construction machinery, farm equipment and material handling fields, also to sell to various industries using A-C's engine-driven generators.

(*More Procurement & Products, p* 72)

Newly-designed Uptegraff tank cover seal...

keeps out contamination...

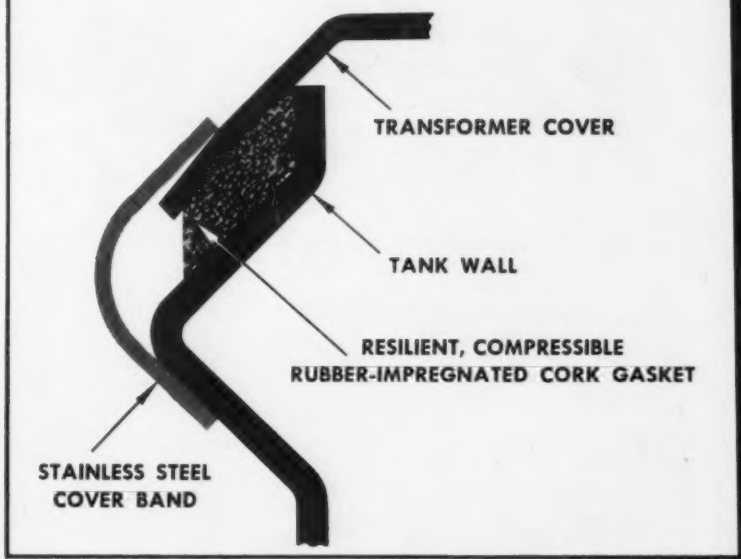
extends service life



Banded cover insures uniform seal

A one-piece stainless steel band with bronze bolts and nuts grips the parallel surfaces of tank wall and cover **firmly** and compresses the cork-and-rubber gasket in a tight, positive seal, uniformly all around the tank. It's easy to tighten, remove and reinstall.

Special Fitting for Testing



Deformable, Resilient, Compressible Gasket

This special diamond-shaped Buna N rubber-impregnated cork gasket is compressed to a limited and predetermined extent between the parallel surfaces of the tank wall and cover. Its elastic limit is not exceeded, so the gasket does not take a permanent set. Consequently, the cover can be removed and replaced repeatedly without affecting the effectiveness of the seal. Cemented to the tank wall on one side and surface silicone-grease treated on the cover side, it provides complete protection against the entrance of oxygen, moisture or any other contaminating influence.

Pressure Testing Proves Seal

Each completed Uptegraff transformer is given a pressure test with dry air at 3 to 5 psi to prove the integrity of its seal. At this pressure, by means of pressure differential manometers, the slightest leak would be quickly detected. For this exclusive Uptegraff feature a special fitting is provided in the tank wall which is subsequently plugged.

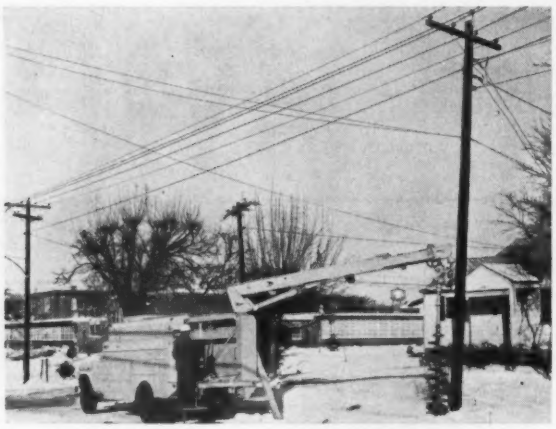
Ask your Uptegraff Representative for details

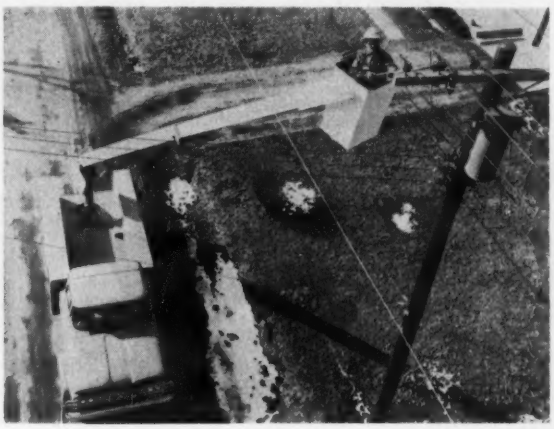
U TRANSFORMERS

R. E. UPTEGRAFF MANUFACTURING CO.

Scottdale, Pennsylvania

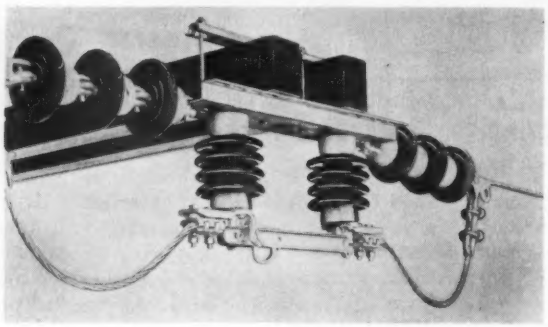
(For further information refer to Readers Service on page 74)





Combination Boom . . .

. . . can be mounted on most heavy-duty line trucks. The Pitman Polecat digs holes, sets poles and hoists aerial buckets. The hydraulic boom swings either way through 360 deg, and digs holes between 24 and 40 ft from pivot. It can be extended under full 4-ton load and reaches 32 ft up. A fiberglass boom extension supports one or two fiberglass buckets.
Pitman Mfg Co, Grandview, Mo.

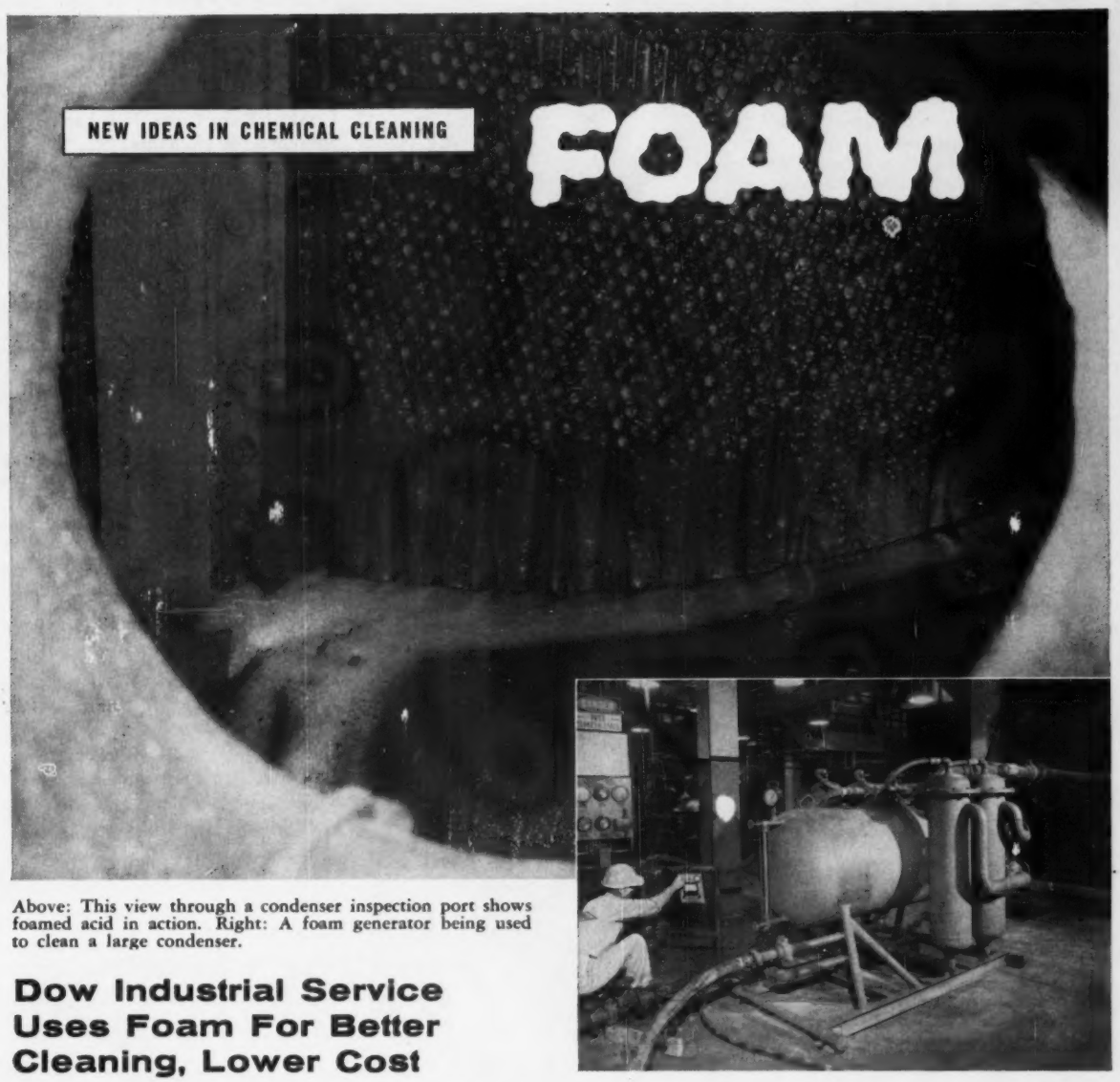


Hook-Operated Switches . . .

. . . are for pole-top or structure mounting. The low-cost type DS line is full rated for 200, 400 and 600 amp, 7.5, 15 and 23 kv. Terminal pads accept any NEMA standard two-hole connector, and connectors for copper and aluminum can be furnished. A broken insulator can be replaced by a NEMA standard unit.
I-T-E Circuit Breaker Co, Greensburg, Pa.

100-Kvar Capacitor . . .

. . . is smaller and lighter than previous model. As much as 1,200 kvar of these 100-kvar units can be mounted on a single pole, and they require less space in other installations. Lighter weight and reduced size make installation and handling easier. The single-phase capacitor is available in ratings from 2,400 to 7,960 v. Its dimensions are 6x20x25¼ in., and weight is 193 lb. Mounting dimensions are the same as those for the previous 100-kvar capacitor.
Westinghouse Electric Corp, Box 2099, Pittsburgh 30, Pa.



Above: This view through a condenser inspection port shows foamed acid in action. Right: A foam generator being used to clean a large condenser.

Dow Industrial Service Uses Foam For Better Cleaning, Lower Cost

A newly-developed method of chemical cleaning is helping plant operators reduce the cost of cleaning large-volume vessels.

The new method uses a foaming agent and a special foam generator to expand inhibited acids, water or alkaline solutions to many times their liquid volumes. Foam-to-liquid ratios up to 300-to-one can be attained. For most applications, however, acid is expanded 20 times.

Chemical costs of cleaning large volume vessels with foam instead of liquid are reduced because far less solvent is required.

Reduced solvent requirements mean that disposal or neutralization is simplified.

The light weight of foam makes possible the chemical cleaning of structures where weight is critical.

Foam cleans faster than liquids because solvents can be used at higher concentrations. This helps to reduce both cleaning and outage time.

Certain mechanical benefits result from the use of foamed solvents. The foam provides a scouring action not given by liquids and it carries sloughed materials readily.

Also, foamed solvent fills vessels, pipes and even bent piping as a plug. This eliminates the need for vent connections and reduces the hazard of gases because they are swept out as they are formed.

The foam cleaning technique is just one of many recent developments by Dow Industrial Service to make chemical cleaning faster, safer and less costly.

For engineered recommendations to solve your cleaning problems, contact the field office nearest you, or write Dow Industrial Service, 20575 Center Ridge Road, Cleveland 16, Ohio.

Chemical Cleaning Services for all industry

DOW INDUSTRIAL SERVICE

DIVISION OF THE DOW CHEMICAL COMPANY

DOW

Readers Service

For additional information on new products, supplies, and services in this issue, the Manufacturers Editor of Electrical World offers his facilities. Check items in which you are interested in list below:

NEW EQUIPMENT

Pitman.....Combination Boom ☐
I-T-E .....Switches ☐
Westinghouse .....Capacitor ☐
Morrison-Pelsue .....Ventilator ☐
Telsta.....Street Light Truck ☐
Control Data.....EDP System ☐
Bodendieck.....Stirrup Clamp ☐
Hydraulic Machinery.....Backhoe ☐

OTHER

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_____

_____

Manufacturers Editor
Electrical World
330 W. 42nd St.
New York 36, N.Y.

* Note: Requests must be received within four weeks of publication date, accompanied by complete information specified. This service cannot be offered to readers in foreign countries or to competitive manufacturers.

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TITLE_____
DEPT._____
COMPANY_____
ADDRESS_____
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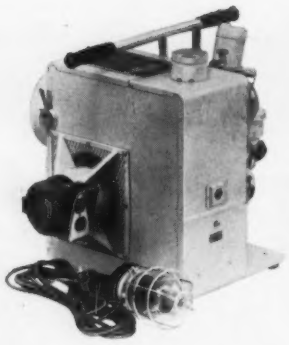
FOR:

Reference ..... ☐
Specs ..... ☐
Trial ..... ☐
Purchase ..... ☐

MAY 2, 1960



Ventilating Heater . . .

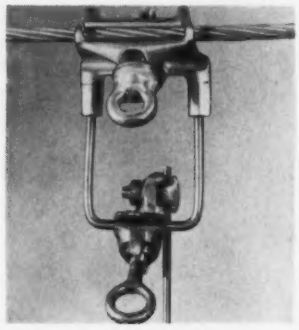
. . . for manholes and underground use delivers 300 to 800 cu ft per min of heated fresh air. It can be used in summer for supplying fresh air unheated. A 300-w generator is furnished as part of the 78-lb model PE-G. Model PE without generator weighs 62 lb.
Morrison-Pelsue Co, 2001 S Bannock St, Denver 23, Colo.

Maintenance Truck . . .

. . . for street lights enables one-man operation. Driver steps directly from cab to hoist platform. The Lamplight truck is lightweight, has a short wheelbase, has ample storage space, and provides the driver good visibility.
Telsta Corp, 2900 Spring St, Redwood City, Calif.

EDP System . . .

. . . permits decentralized operation. Desk-size 160 Computers located at the convenience of the user operate with the large scale 1604 Computer and have immediate access at any time to its high speed and large computing capacity. Each 160 unit of the Satellite Computer System is an autonomous directed data processing center.
Control Data Corp, 501 Park Ave, Minneapolis 15, Minn.



Stirrup Clamps . . .

. . . for hot stick installation fit No. 6 to ¾-in. dia. wire. Series 9265 models are available for connecting aluminum or copper conductors or aluminum to copper. Aluminum screws are used with aluminum body models and bronze screws with copper-base alloy units.
Bodendieck Tool Co, Rte 48 North, Taylorville, Ill.

Backhoe . . .

. . . mounts on any 2-ton truck. HY-HOE 250 has ⅜-yard struck capacity, 180-deg wrist action at the bucket, and digs 14 ft deep. It is also available factory-mounted on a truck with counterweighted front end for added stability.
Hydraulic Machinery Co, Waukesha, Wis.

QUALITY-SERVICE

CADWELD electrical connections rank first in both categories.

QUALITY—The connection has 100% current carrying capacity —cannot loosen or corrode and will outlast the life of the conductors.

SERVICE—Stocking CADWELD distributors are located in all major trading areas in the United States and all are continually serviced by our staff of company field engineers.

For the best in electrical connections—specify Cadweld

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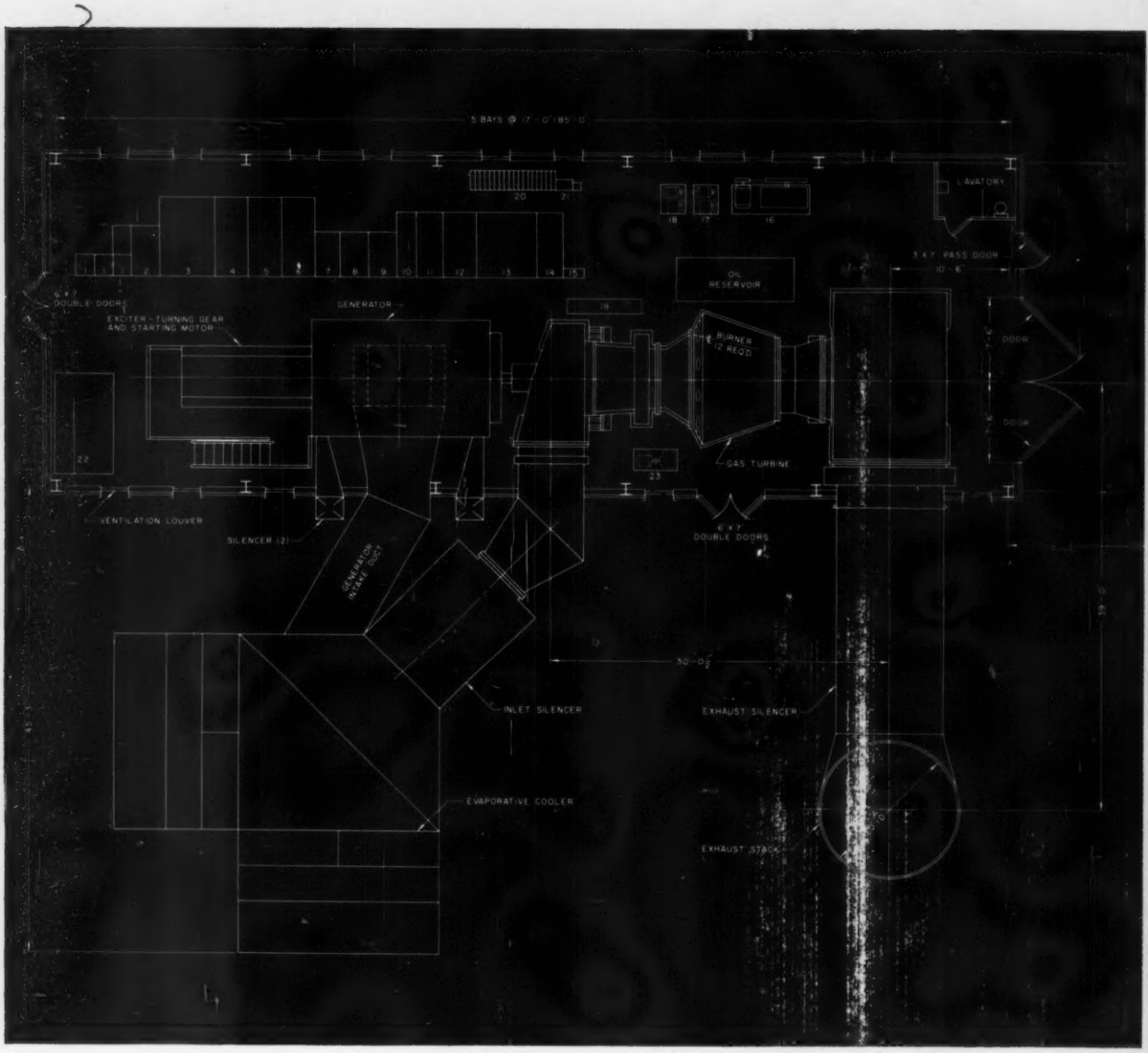
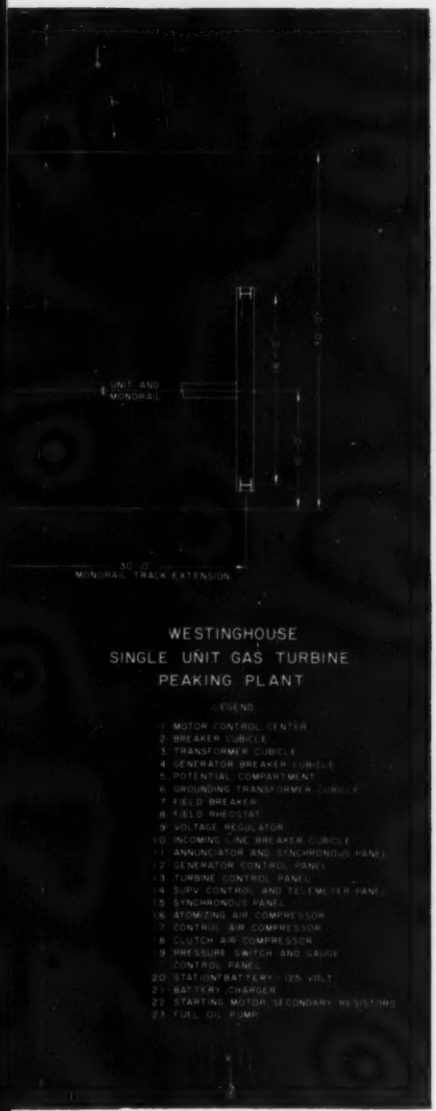
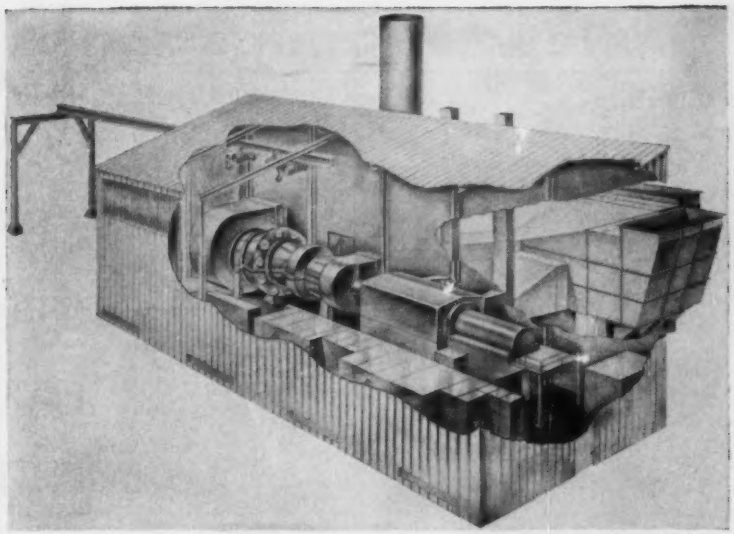


WESTINGHOUSE GAS TURBINES... A NEW DIMENSION IN PEAKING POWER ECONOMICS

MINIMUM COST PEAKING UNITS REDUCE CAPITAL EXPENDITURES, CUT OPERATING COSTS

In order to meet the increasing peak load generation problem of growing utility systems, Westinghouse has developed a complete 22/27.5-mw gas turbine peaking plant. Utilities can save significant capital by installing a minimum-first-cost Westinghouse gas turbine peaking unit, postponing the addition of a large-size base load machine to the system.

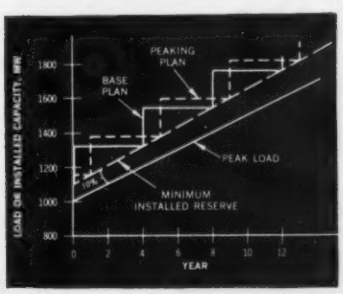




This typical Westinghouse gas turbine peaking plant, shown in layout and in cross section, postpones capital expenditures, lowers operating costs. Westinghouse can supply all equipment for the complete installation, including buildings, with all the advantages to you of single source of supply, and single responsibility.

Typical Capital Savings with a Peaking Unit

A recent Powercasting study for a utility working on a 4-year cycle of adding base load machines showed that the addition of gas turbine peaking plants allowed them to postpone buying base load generating apparatus for an additional year. Economic comparisons showed a potential net capital saving of more than $800,000 over a 13-year period, or better than $200,000 for each cycle. (Graph below left.)



Three Reasons Why Gas Turbine Peaking Units Reduce Operating Costs

Besides the savings from postponing large capital outlays, the Westinghouse gas turbine peaking plant offers:

$110/kw
$95/kw

Lowest Plant Cost. The complete gas turbine peaking plant, capable of producing 22 mw up to an ambient temperature of 100° F, can be installed for $110/kw. At 40° F, the plant output increases to 27.5 mw, and the relative installation cost decreases to $95/kw.

Lowest Operating Cost. The complete plant may be remotely operated, thereby minimizing cost of operating labor.

$50/kw

Lowest Transmission Cost. The flexibility of location of this power plant can minimize transmission system investment as much as $50/kw.

COMPLETE PEAKING PLANTS AVAILABLE FROM WESTINGHOUSE

Westinghouse will coordinate the complete order . . . will supply gas turbine, generator, switchgear, regulating equipment, even complete housing facilities for easier buying, delivery and installation. In addition, Westinghouse can supply transformers, power circuit breakers, and other apparatus for your system when necessary.

Let us prove that Westinghouse gas turbine peaking plants are the most economical method of generating necessary extra capacity. Call your Westinghouse representative, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-50614

YOU CAN BE SURE...IF IT'S

Westinghouse

Distribution cost per customer greatly reduced by EBASCO planning

Wherever Utility Companies have called on Ebasco engineers for help in planning expansion of transmission-distribution systems . . . costs have been reduced, efficiency materially increased.

How does *your* system look in terms of present needs? Of future expansion?

Ebasco offers you long-range *or* interim planning services based on over 50 years' experience in finding economical solutions to the problems of the electric utility industry. Ebasco analyzes your present system minutely: from markets, to load growth, to future requirements. Ebasco engineers make their recommendations—based on practical world-wide experience—as to project locations, rights-of-way, land acquisition. Their thorough knowledge of methods, equipment, capacities provides invaluable assistance in comparing investment and operating costs.

Consider *your* distribution needs . . . improvement program, new installation, partial or complete construction? You avoid delays, errors, costly indecision when you call on Ebasco.

Our brochures describe Ebasco's services and how they may be of use to you. For copies, write Ebasco Services Incorporated, Dept. M, Two Rector Street, New York 6, N. Y.

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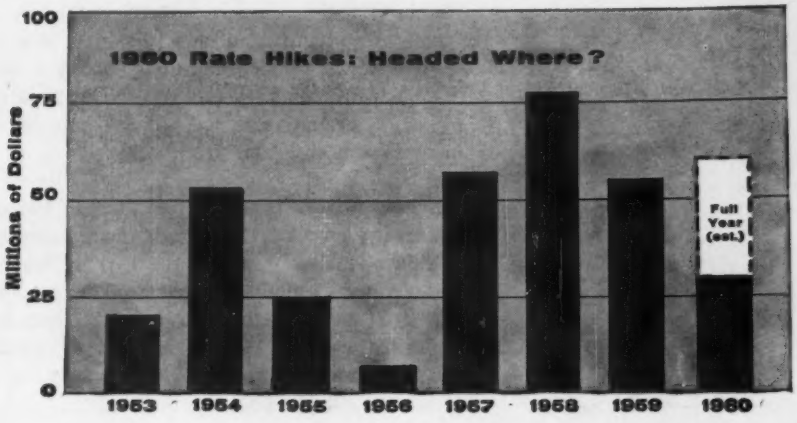


Rate Hikes Head for $60 Million

Report on
Rates and Regulation

As rate hikes go, 1959 was a so-so year. It was better than most, but a long stretch from the best on record. The year closed with about $55 million worth of increases in the books, to make 1959 the fourth best year of the last 12. Better things seem in store for 1960. With $92 million of increases pending at year-end—an amount topped only once, in 1958—and with some $30 million okayed thus far, it seems clear that 1960 will be a $60 million year. That is somewhat short of the record of the recent past; the busiest years before the commissions were 1952 and 1958, when utilities were granted roughly $76 million. But it would be enough to make 1960 the third best year since 1948.

Dollar increases over the years have been spotty, as the chart above shows. Only one thing is clear; costs are up all along the line, and it appears that, for many power customers, the honeymoon is over—many companies simply cannot continue to sell electricity at pre-war rates. There are, of course, always some exceptions; last year, for instance, at least 15 companies had rate decreases. But there is a practical limit to the number of Btu's utility engineers can squeeze from a pound of fuel, and the number of kwhr they can get from a pound of steam. All costs are up, and the utilities must hold the line with greater efficiency, but measure results in terms of a steadily shrinking dollar. Most commissions are aware of this, and have granted rate relief.

Not everyone, of course, comes away from a rate case in high spirits. In recent actions, for example, the Pennsylvania PUC lopped off two-thirds of an increase that Pennsylvania Power Co had requested, awarding the utility $484,000 in late March in a rate increase that had been under suspension since May, 1959. And in Oregon, Public Utility Commissioner Jonel C. Hill pared away a substantial slice of an increase asked by Portland General Electric (PGE received $1.9 million of the $5.25 million it asked) and also whittled down a Pacific Power & Light request (PP&L was allowed $3.5 million of a requested $4.6 million).

The allowed increases amounted to a 6.2% return for PGE, and a 6.1% return

for PP&L. Taking note of Pacific Power & Light's competitive situation with municipal or PUD systems in the state, Hill scored, "needless and wasteful duplication of electric utility service facilities in the same area."

In Washington, Pacific Power & Light's bid for a 10% rate increase was denied March 23 by the Washington State Public Service Commission, which said PP&L is making a fair rate of return on its Washington operations, and "requires no increase in rates to keep it in a healthy financial condition." The Commission concluded that the company is entitled to a rate of return of from 5.75% to 6% on its Washington investment, and that it is now earning about 6%. PP&L had requested a 6.8% rate of return when it filed for the rate increase almost a year ago.

But only a week later, the Washington Commission authorized an 11% rate boost for Puget Sound Power & Light, based on a return of 6.25%. The $3.6 million-a-year increase was the first in Puget Sound's 47-year history. In its findings, the Commission upheld company practices in charging different rates in the 11 counties that it serves. It conceded that Puget's rates should be slightly lower in the Seattle-Tacoma area, where Seattle City Light and Tacoma City Light offer competition. Puget does not serve these cities directly, but it does serve surrounding communities.

Regulatory lag, which causes many utilities to line up at commission doors for new increases before ink has dried on ones just granted, continued its mild easing with greater use of the forward rate base—a trend that got its start around 1957 or 1958. Last year, the forward rate base received a vote of confidence by commissions in Wyoming, California (where it has stirred up the most attention), Maryland, Illinois, Wisconsin, and New Jersey. Although most forward rate bases project only slightly ahead, say 3 months in the future for a 12-month period, one important California decision extended a full, 12 months forward rate base to Pacific Gas & Electric and two gas suppliers. The rate base was extended a year into the future, until July 31, 1960—the first time a full 12 months had been allowed by any commission.

Baltimore Gas & Electric benefited too, from a forward rate base the Maryland PUC had approved in July, 1958, but which a Baltimore City Court had struck down in April, 1959, as "unreasonable and unlawful." But late in June, the Maryland Court of Appeals supported the PUC and the utility, okayed the $6.04 million increase, commenting that Baltimore Gas & Electric was entitled to earn an overall return of 6.2% on the fair value of its plant at the time of the original ruling, including some $32 million in additions to plant scheduled for 1958. It commented, "Conditions in recent years have persuaded regulatory agencies throughout the country to include in the rate base as used and useful in the public service, property estimated to be in service by the end of the test year. The conditions that have prompted this practice are inflation, attrition and regulatory lag." It called the city court's interpretation of state law "literal, rigid, and completely inelastic."

Another interesting rate decision, centered on cost of capital, seemed to echo the words of retiring President Matt L. McWhorter as he spoke before the National Association of Railroad and Utilities Commissioners at its 71st Annual Meeting in Philadelphia last October. "We are all going to be faced," he said, "with mounting pressure for recognition of the 'cost of capital' concept in our rate making."

The case, concerning a gas company, is considered one of the most significant decisions of 1960—for all utilities. The company, Manufacturers Light & Heat, went before the FPC to settle an $850,000 refund to its customers on some $4.2 million in rate increases stretching back to July, 1957. In its Feb.

Here Are 1959 and 1960 Rate Actions at a Glance

These Companies Were Granted Rate Hikes in 1959 . . .

Arizona Public Service	$ 365,000
Bangor Hydro-Electric	365,400
Black Hills Power & Light	46,700
Boston Edison	4,203,000
California Electric Power	20,700
Central Hudson Gas & Electric	300,000
Central Maine Power (a)	898,000
Cleveland Electric Illuminating	2,750,000
Columbus & Southern Ohio	3,400,000
Connecticut Valley Electric	69,600
Consolidated Edison of New York	8,400,000
Consumers Power	6,788,000
Iowa-Illinois G&E (Illinois) (a)	567,000
(Iowa)	83,000
Kentucky Power (b)	100,000
Missouri Utilities	92,400
Montana Dakota Utilities (Montana)	292,850
(North Dakota)	12%-13%
Niagara Mohawk Power	$7,500,000
Northern Berkshire Electric	175,900
Ohio Edison	2,400,000
Orange & Rockland Utilities	458,000
Otter Tail Power (c)	408,000
Pennsylvania Electric (d)	45,000
Philadelphia Electric	1,110,000
Potomac Electric Power (D. C.)	2,937,800
(Maryland)	1,732,600
(Virginia)	148,000
Quincy Electric	171,000
St. Joseph Light & Power	618,000
Southern Berkshire Power	156,600
Tampa Electric	1,585,000
Union Electric (Illinois)	1,130,000
(Iowa)	285,000
(Missouri)	6,477,800

While These Hikes Have Been Okayed This Year . . .

Cleveland Electric Illuminating	$ 3,100,000
Columbus & Southern Ohio	550,000
Consolidated Edison of New York (f)	14,000,000
Missouri Utilities	543,000
Pacific Power & Light	3,544,600
Pennsylvania Power	484,000
Portland General Electric	$1,924,700
Puget Sound Power & Light	3,634,000
Union Light, Heat & Power	969,000
Washington Water Power	1,610,900
Weymouth Light & Power	373,200
Wisconsin Michigan Power	207,000

And These Hikes Are Pending . . .

Carolina Power & Light	$ 460,000
Central Illinois Light	2,000,000
Cincinnati Gas & Electric	2,238,000
(negotiating with municipalities)	535,000
Consolidated Edison of New York (f)	31,000,000
Ohio Edison (Ohio)	2,540,000
Otter Tail Power (North Dakota) (e)	350,000
Otter Tail Power (South Dakota)	92,200
Public Service of New Jersey	$21,400,000
Public Service of Colorado	10,000,000
Public Service of Indiana	5,200,000
Southern Wyoming Utilities	36,000
Toledo Edison	1,710,000
Washington Water Power	2,249,000
Wisconsin Michigan Power	1,077,000

(a) Being contested before the courts
(b) Subject to final determination by commission
(c) Requested from various towns, most approved
(d) Formal complaints filed, and hearings to be held
(e) Denied, but appealed to courts
(f) $31 million requested; $14 million interim increase allowed

25 decision, FPC considered the utility's new financing, which is to be heavy in the near future. Commenting on the rate of return necessary for future expansion, FPC concluded that a fair return on equity would be on the order of 10%. As to overall return, FPC favored 6¼%, while the company wanted 6¾%. FPC ruled that a 6¼% overall rate of return would be applied to the period before April, 1959. But beyond that date, due to mounting debt costs last year, it ruled in favor of an overall 6½% return. It noted that debt cost the company about 3.91% in April of last year, which, with a 40% equity ratio, would yield a return on equity capital of only 9.73% if a 6¼% return were allowed. It allowed a 6½% rate of return, which would yield a 10.25% to 10.50% return on equity, which FPC considered adequate to meet expansion requirements.

Normalization of income taxes also figured heavily in important rate cases. Normalization, by which a utility may charge off to tax expense the higher

income taxes from an assumed straight line depreciation policy—even though it actually pays lower taxes due to liberalized depreciation or accelerated amortization—played a key role when the New York PUC pruned Niagara Mohawk's bid for a $10.5 million increase down to $7.5 million last year, and pared Central Hudson Gas & Electric's request for $1.7 million down to $300,000. Only actual taxes were allowed for liberalized depreciation and accelerated amortization in both cases. And a recent California PUC ruling (EW, April 25, p 64) reflects the same view.

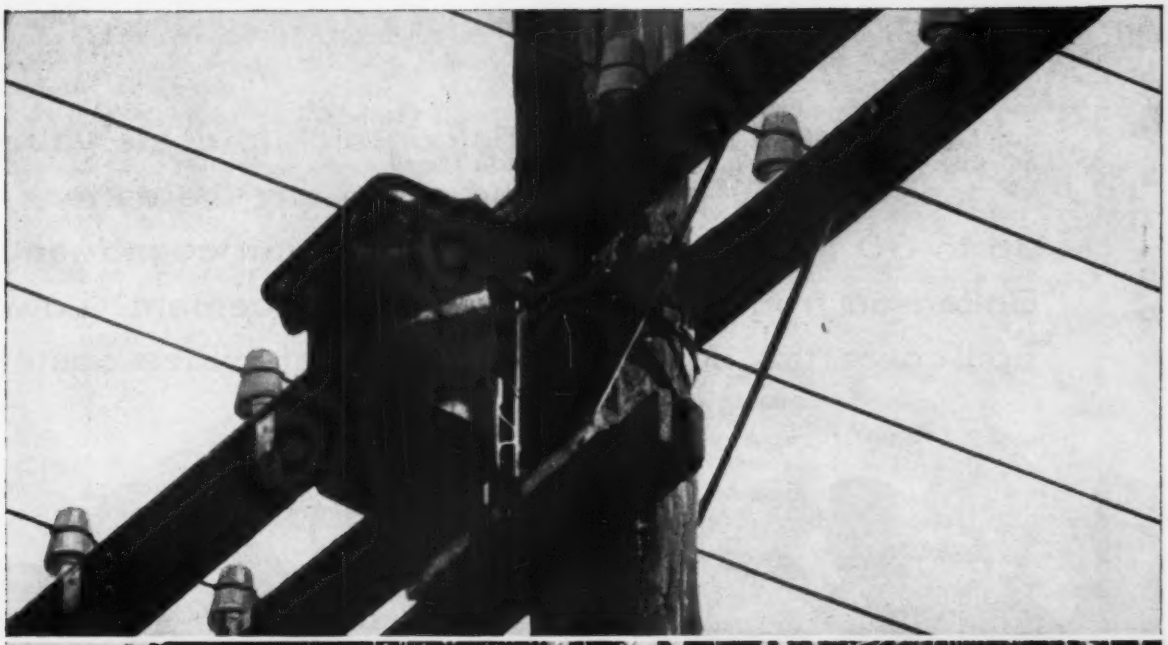
But in a more recent case, the North Dakota Supreme Court struck middle ground. On March 23, it allowed Montana-Dakota Utilities to normalize tax savings from accelerated amortization (Section 168 of the Internal Revenue Code of 1954), but refused permission to normalize tax savings from liberalized depreciation (Section 167). Thus, it overturned an earlier court decision to disallow normalization in either case. The North Dakota Supreme Court held that to refuse normalization under Section 168 would nullify Congress' intent by destroying the very incentive for emergency construction that Congress attempted to establish. Section 168 provides for a rapid writeoff (or depreciation) of property over a five year period, thus a tax saving.

A more important case involving normalization falls outside the electrical industry, but is being watched by the electric utilities as a possible precedent. The Illinois Supreme Court, on April 1, reversing its earlier decision in the Alton Water Co case, granted a form of modified normalization. It okayed normalization of taxes, but put strings on the use of the deferred tax reserves that arose, ruling such reserves must be deducted from the rate base. The tax savings must not be distributed to the stockholders or be transferred to surplus, thus ruling out any direct benefit for the stockholders.

Another interesting ruling came down from an Illinois Circuit Court, which slapped the Illinois Commerce Commission on its determination of fair value in an Iowa-Illinois Gas & Electric rate case. The commission had granted the utility only $270,000 of a requested $567,000, for a 5.85% overall rate of return on a fair value rate base weighted 25% for present costs and 75% for historic costs. The court ruled the 25% weighting for present costs was inadequate, saying, "The value of money is an important factor in fixing a rate base, so that reproductive cost has more weight than original cost." For fair value purposes, to weight plant only 25% for current costs of reproduction, the court said, is "contrary to the manifest weight of the evidence, and, therefore, contrary to law."

Electric Companies Advertising Program expenses were thrown for a loss generally in 1959, with the FPC handing down a ruling that disallowed them as an operating expense. Individual cases, too, brought pressure on ECAP costs, perhaps the most notable being Consumers Power's bid for a $15.3 million hike, which was pared to $6.8 million by Michigan Public Service Commission. Michigan PUC ruled out ECAP expenses from inclusion in the cost of service, but went still further—it even disallowed some sales and merchandising expenses, and about $70,000 in grants for industrial development, scholarships to colleges, and courtesy advertising.

It was another story for Union Electric, though, which was allowed some $41,108 in ECAP costs as an allowable expense. In its ruling, the commission said, "In view of the fact that the commission is of the opinion that management should control such expenditures as long as they are within the limits of reason, and in view of the fact that the commission is unable to find that such advertising would not result in benefits to the rate payers, the expenses incurred therefor will be allowed." Incidentally, the commission also found a fair rate of return of 5.48% on a fair value rate base that was 18% higher than net original cost.



When poles and palms don't mix...

No poles or overhead wires will mar the beauty of Arvida's Royal Palm Yacht & Country Club residential community! With 742 homesites, this distinguished Boca Raton, Florida community is putting *all utilities underground*. For the job Arvida selected Orangeburg Fibre Conduit—the best known, best-selling Brand in America. And for good reasons: Orangeburg Conduit is lightweight, easy to install. Its self-sealing joints and impermeable walls keep water out for good. Its 100% smooth fibre raceway adds years to cable life. Get all the facts on Orangeburg Fibre Conduit. Write Dept. EW-50 for Catalog 52.

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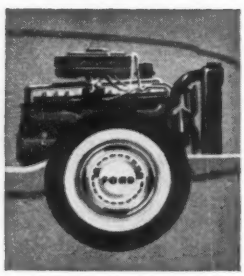
Architect's drawing—Arvida home of Dr. and Mrs. John F. Pearl. Architect: Arthur H. Rude, of Ft. Lauderdale.

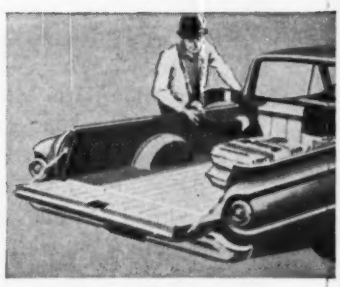
Orangeburg Fibre Conduit is distributed by Graybar Electric Co. and General Electric Supply Company with branches and stocks in principal cities.
ORANGEBURG MANUFACTURING CO., Orangeburg, New York. Division of The Flintkote Company, Manufacturer of America's Broadest Line of Building Materials.

Completely new—Ford's Falcon pickup costs you less the day you buy and every day thereafter! Up to 30 miles on a gallon! Single-unit construction. Bolted-on front fenders for easy replacement! Lower oil costs, tire costs, all-around maintenance costs!

NEW Ford Falcon RANCHERO



All-new Six. Modern Short Stroke engine with plenty of turnpike power! There's 4,000 miles of driving between oil changes!



Big 6-foot box . . . nearly 8 feet of load length with tailgate flat! Load capacity is ample for most jobs. Loading height is a low 27 inches!

It looks like pure pleasure—and it is. But when it comes to saving money, Ford's new Falcon Ranchero is all business!

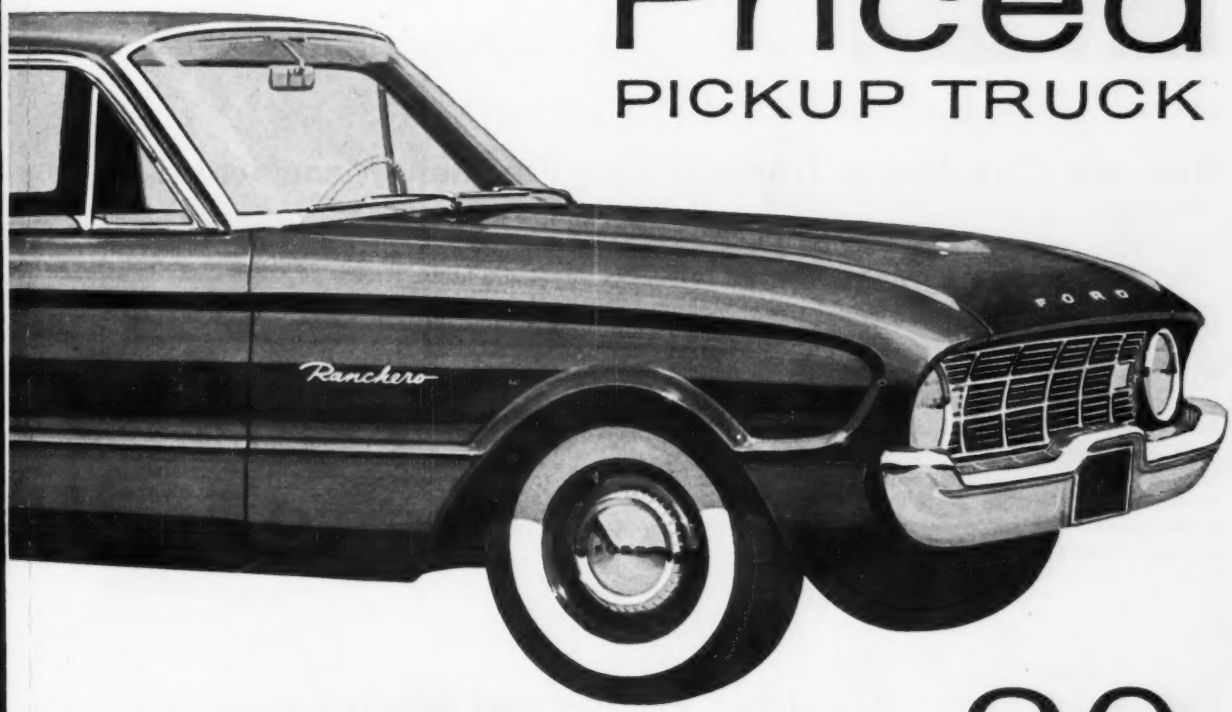
As a start, it's priced lower* than any other pickup in America. It gives you spectacular gas mileage—up to 30 miles on a single gallon, yet its new 90-horsepower Six is geared to handle a full-sized load.

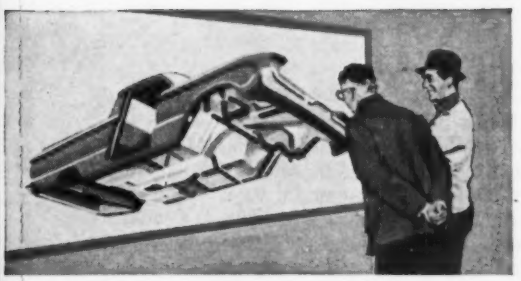
The Ranchero's solid single-unit construction, its bolted-on front fenders, and other low-cost replacement parts . . . all mean you'll save on maintenance costs! In its big 6-foot box there is room a-plenty for nearly any pickup job . . . and in its beautifully styled cab there is room for three in stretch-out comfort!

See your Ford Dealer and action-test the Falcon Ranchero—the new kind of pickup that's full-sized for work, over-size in comfort, but only half-size in costs!

*Based on latest available manufacturers' suggested retail delivered prices with comparable standard equipment.

Lowest Priced* PICKUP TRUCK





Single-unit construction . . . It's tighter, quieter, longer lasting. All main underbody structural members are heavily zinc-coated for greater durability . . . protects against rust and corrosion. Front fenders bolt on to cut maintenance costs!

up to 30 miles per gallon!

FORD TRUCKS COST LESS

News About People

Brumit Named Florida Power VP, Comptroller

Lawrence D. Brumit has been made vice president and comptroller of Florida Power Corp. He has served as comptroller since early last year and previously had served four years as assistant comptroller.

Starting with Florida Power 38 years ago, he first served in St. Petersburg in the accounting department. He later served as traveling auditor and assistant auditor.

As chairman of the Edison Electric Institute Internal Auditing and Taxation Committee, he received an outstanding service award for his work with that committee.

Kearney Corp Makes Friedrich Vice President-Manufacturing

J. C. Friedrich (photo) has been named vice president in charge of manufacturing of the James R. Kearney Corp. Friedrich will coordinate and supervise manufacturing operations of the company's St. Louis plant and plants at Fayetteville, Ark., and Clarinda and Shenandoah, Iowa.

He joined Kearney Corp in 1926 in the engineering department and was made plant manager in 1928. In 1956 he was appointed production manager of the St. Louis and outlying plants. Before joining Kearney, Friedrich was engaged in engineering layout with Western Engineering Co of St. Louis.

E. A. Groeteke has been promoted to plant manager of the company's St. Louis plant. He came to Kearney in 1952 and prior to his recent appointment was plant manager of the firm's Shenandoah plant and plant manager of the Clarinda operation.

Leonard J. Pierce Appointed President of Brown Co

Leonard J. Pierce has become president of the Brown Co, northern New England pulp, paper and forest products manufacturers.

Pierce had been vice president-operations of Penobscot Chemical Fibre Co. Before that he was with the St. Croix Paper Co. He started with them in the mill as a tender and then foreman. He advanced to assistant to the superintendent and superintendent of the mill. He joined Penobscot Chemical Fibre as superintendent, later becoming assistant to the general manager before being named vice president.

(*More News About People on page* 90)

Another boost for table-top cooking!

General Electric's newest Automatic Skillet further extends the market for table-top cooking appliances. Every one of these appliances sold adds an average of $5.40 a year to utility revenues.

NEW! General Electric Tip-Top Skillet—features two great new conveniences. New retractable leg pulls down out of handle, tilts the skillet so that food drains as it fries. Two-position tilt-top lid fits into helper handle, helps control spatter. Skillet is available in 11" and 12" sizes. Model C-112 and C-122.

General Electric Automatic Sauce Pan—makes cooking easier, food tastier. Stews, simmers, fries—just dial correct temperature. Completely immersible. In two quart and four quart sizes.

General Electric Square Skillet—removable thermostat gives controlled heat, assures peak flavor, automatically. Completely immersible. Comes in 11" and 12" sizes.

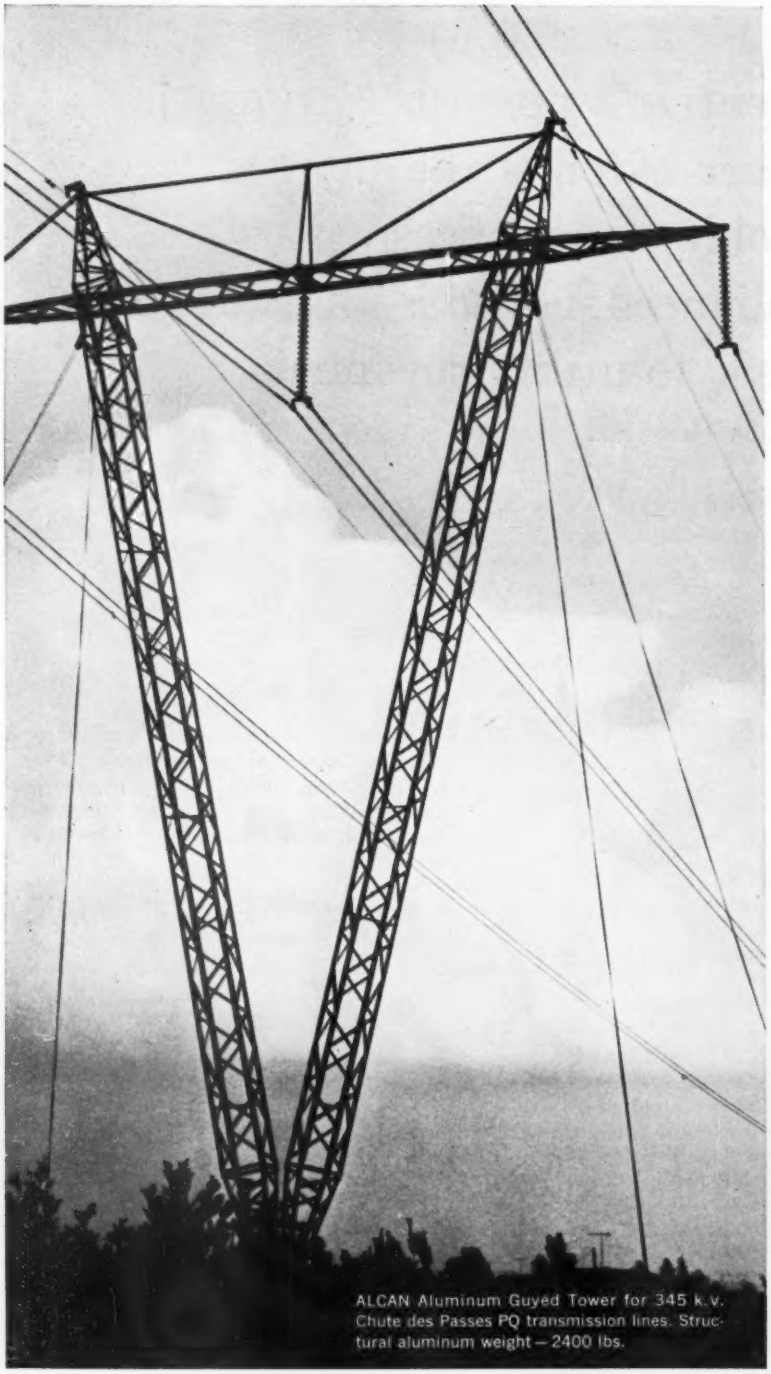
For more information, write to General Electric Co., Portable Appliances Dept., Bridgeport 2, Conn.

Progress Is Our Most Important Product

GENERAL ELECTRIC

From Aluminium Limited research–

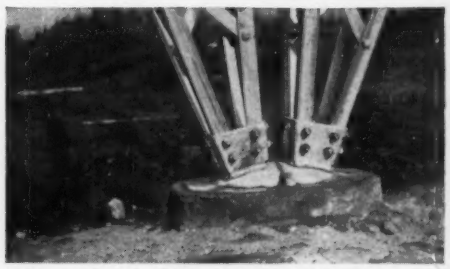
The ALCAN



ALCAN Aluminum Guyed Tower for 345 k.v. Chute des Passes PQ transmission lines. Structural aluminum weight – 2400 lbs.

- Designed for installation on level ground . . . mountain or in swamp
- Weight savings of up to 80% due to the combination of efficient aluminum design and the guyed-tower principle
- Lightweight components are readily transported by panel truck, motorboat, helicopter . . . easily carried by hand
- Tower can be raised by one crew in minutes!
- Offers all the maintenance economies of aluminum

Michael Flynn Manufacturing Co., Philadelphia, Pa., are the authorized manufacturers for the ALCAN Guyed Tower.



When used in the "V" arrangement only one footing and four inexpensive guy anchorages are required—eliminating the need for precision in footing work. Side-hill problems of leg extensions are nonexistent.

Aluminum Guyed Tower

—a revolutionary new high-voltage transmission structure that "makes molehills out of mountains"

The ALCAN Aluminum Guyed Tower brings substantial economies to the construction of high-voltage transmission lines.

The new unit—designed for "V" or parallel leg erection—has been created by ALCAN engineers to take full advantage of aluminum. The resulting combination of lightweight metal and the guyed-tower principle has many advantages over rigid conventional types.

Versatile Application

Particularly well suited for single-circuit lines, the ALCAN Guyed Tower is adaptable to all types of terrain without the additional costs normally expected with adverse footings and side-hill conditions.

Economical Installation

A primary advantage of the new tower is a weight reduction of up to 80% less than the rigid steel principle. This results in lower installed costs through lower transportation expenses . . . lighter erection equipment . . . simpler footing alignments . . . reduced erection time.

Easily Handled

All ALCAN Guyed Tower components can be delivered to the erection site with no need for special carriers or heavy lifting gear. Lightweight 20-foot leg sections weighing less than 200 pounds and major cross-arm pieces are readily handled by workmen without need for auxiliary equipment. This permits inexpensive yard assembly of a major portion of the tower before distribution to the tower sites.

Simple Assembly

Depending on the height required, only six to ten standard leg sections and a cross-arm go to make up each tower . . . sections can be quickly joined during ground assembly of units.

Single or Twin Base Erection

The ALCAN Aluminum Guyed Tower can be erected on a single base in the form of a "V" or on twin bases as a portal type, whichever style best suits conditions of terrain and right of way.

Fully Tested Design

Ultimate load tests on components as well as on complete towers have been carried out to establish the behavior of this arrangement and to confirm design principles. Special footings and guy anchorages located in marshland, loose sand, packed earth and rocky terrain have also been tested to full design loadings.

This development and test program resulted in the installation of four guyed towers in the ALCAN 345 k.v. Chute des Passes transmission system. Ranging from 76 feet to 96 feet from base to cross-arm, two are located on rock and two were installed in a swamp.

Uses Special High-Strength Alloy

The new ALCAN Guyed Tower is made of another Aluminium Limited development—ALCAN B51S aluminum alloy, which keeps costs low through a combination of high structural strength and good formability. Like all aluminum structures—maintenance costs are minimum.

Aluminium Limited

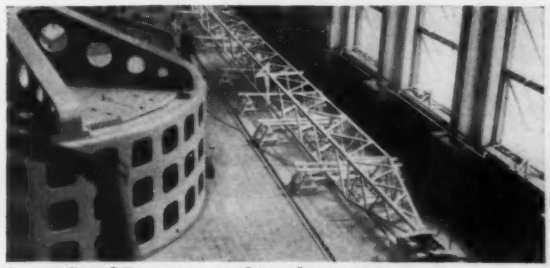
ALCAN

INQUIRIES FOR ADDITIONAL INFORMATION SHOULD BE ADDRESSED TO

Aluminium Limited Sales, Inc.—630 Fifth Avenue, New York 20, N. Y.

CLEVELAND • CHICAGO • LOS ANGELES • DETROIT • ATLANTA • ST. LOUIS

ALCAN Aluminum Guyed Towers over 100 feet in height have been raised in less than seven minutes from preassembled position on ground using standard pole-line truck and rigging. In rough terrain tower can be erected in large lightweight sections.



ALCAN Guyed Towers were subjected to tests by Aluminium Limited at Isle Maligne, Quebec, Powerhouse, with single legs up to 96 ft. in length, under loads of 93,000 lbs.

Neale Model "K"

END
TREE-TRIMMING
PROBLEMS

•

ELIMINATE
STORM
OUTAGES
with
AERIAL
CABLE
**FIELD
SPUN**

•

It's Neater
Easy to Install
Proven in the Field

•

The new Model K pull-type Spinner was designed especially for power cables, with a background of many years' experience in telephone cables. It has been adopted as standard by many electric utilities.

- Lashes three cables as large as 2" O.D. at one time.
- Lashes single cable as large as 3½" O.D.
- Lashes with one or two lashing wires.
- Lashes with wire of any type or size.
- Works on any size strand.
- Weighs only 36 pounds (less wire).

For descriptive information and application data please drop us a note.

CABLE SPINNING EQUIPMENT CO.

3100 Topeka Ave. Topeka, Kans.

Phone CE 2-7234

PERSONAL BRIEFS

B. W. Rainwater has been named assistant to H. L. Bowen, vice president of Georgia Power Co. In addition to his new duties he will continue to supervise the activities of the company's insurance section.

James F. Fairman, senior vice president, Consolidated Edison Co of New York, has been selected to receive the 1960 National Society of Professional Engineers Award for outstanding service to the engineering profession.

William Robinson has been elected assistant secretary and assistant treasurer of Pennsylvania Power Co.

Central Illinois Light Co has elected **Q. W. Wellington,** vice president of operations, to the board of directors.

Wendell R. Wilmoth has joined the Duke Power Co legal staff as assistant general counsel.

Southwestern Electric Power Co has named **Larry B. Phillips Jr,** manager of the rate department.

Clarence W. Turner has been appointed manager, wage and salary administration and office operation section of the personnel department, Duquesne Light Co.

OBITUARY

Richard M. Wood, 60, construction manager with Stone & Webster Engineering Corp. . . **Albert Babcock McCoard,** 70, vice president and principal financial officer of New Orleans Public Service Inc . . . **Frank G. Mayer,** 57, sales manager and assistant manager of the St. Paul Division, Northern States Power Co . . . **John B. Hussey,** 53, member of the Federal Power Commission . . . **Vernon Durbin,** 75, associate director of engineering and consultant with Holtzer-Cabot Electrical Division of National Pneumatic Co, and a holder of more than 50 patents . . . **Stafford J. King,** 78, New England sales manager, Sangamo Electric Co . . . **Louis A. Brettner,** 52, formerly with Reddy Kilowatt Inc.

Helicopter Builds 115 Kv

(*Continued from page 39*)

pulls a tension of about 2000 lb, the lineman on the deadend structure clamps that end of the wire and releases it from the sling. The helicopter pulls in both phase conductors and shield wire. During the pull a brakeman at the reel wagon maintains a proper tension. Radioed instructions from the pilots supplement his visual control. Meanwhile another group, also transported with equipment to and from its work site by air, is tensioning the cable strung the day before.

The only slow-down is the minor time for splicing between reels. Planning also allows time for refueling the helicopter, which has a normal working time of five hours per day under such conditions. Puerto Rico Water Resources Authority has experienced an average time of 30 minutes to pull in 5,000 ft of wire. This permits stringing 25,000 ft per day, since the transport of men and materials consumes a large part of the daily flight minutes available. This airlift, however, eliminates the need for construction roads except to the staging areas. This is also a big extra in relations with sugar cane and coffee farmers who see much less destruction of bearing plants.

While cost of this stringing operation is half that for conventional methods, the Authority has realized greater savings in the hauling and placing of poles by air. This was their first use of the helicopter. It has reduced the cost of transporting a 65-ft pole from $266 to less than $50. Further savings are expected. As many as 90 loads of poles and crossarm packages have been hauled in one day. The daily average is 50.

The helicopter section has also experimented with placing fully dressed poles for rural distribution. In view of the 9000 poles to be placed this year the Authority is studying the feasibility of supplementing the S-58 helicopter with a lighter craft for setting lighter weight, lower voltage poles and for line inspections. With a cheaper 'copter, a newly designed earth-boring machine transportable by air, and more experience, they expect to reduce further the present $43-per-pole cost on rural electrification projects.

Harper produces over 100 alloys to "**thread the needle**" in meeting your specific corrosion-resistant needs

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Difference

What alloy do you need? In what size and shape fastener? Harper maintains a stock of over 150,000,000 pieces in over 100 alloys to meet your requirements *quickly*. Alloying is an important part of Harper's completely integrated operation that includes elements, billets, and extruding to fabricating parts—assuring you of uniform high quality at lowest possible prices. Harper distributors everywhere maintain complete stocks for immediate delivery. See your Yellow Pages.

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Recent Economic Growth — The Numbers Game

If it truly portrayed recent rates of economic growth in the United States, the report on employment, growth and price levels recently issued by the staff of the Joint (Congressional) Economic Committee would point up scarcely less than a national disaster. Among other things, it would document impressively Premier Khrushchev's crack that "the capitalist steed the United States is riding . . . is worn out."

One of the major findings of the Joint Committee's staff (in the Eckstein Report, named for its staff director Otto Eckstein) is that between 1953 and 1959 the average rate of growth of physical output in the United States was only 2.4 per cent per year. This is scarcely more than half the average annual rate of growth of 4.6 per cent the staff found to have prevailed between 1947 and 1953.

Happily, however, the report does not reflect the basic economic realities. Its finding on relative rates of economic growth for the two periods is a statistical *tour de force* which, by the selection of certain figures and certain dates, distorts the record of America's long-term economic growth.

Playing The Numbers Game

By the selection of appropriate starting and terminal periods it is possible to document almost any rate of economic growth that is desired. The table at the bottom of this page shows you how this can be done. It will also show you how the Eckstein staff worked out its shocking contrast in growth rates. The table is built like a schedule of airplane fares between different cities. The postwar years 1946 through 1959 are put down on two axes. One runs down the left hand column, the other runs across the top of the table. Put your finger on the point where the two axes intersect and you have the average rate of growth for the period covered.

ANNUAL AVERAGE GROWTH RATES OF THE U.S. ECONOMY, 1946-1959*

(Percent increases, starting year to terminal year, of GNP in 1954 dollars).

Starting Year \ Terminal Year	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1946	X	–0.1	–1.9	–1.2	3.0	3.9	3.8	3.9	3.2	3.7	3.6	3.4	2.9	3.2
1947	X	X	3.8	1.8	4.1	4.9	4.6	4.6	3.7	4.2	4.0	3.8	3.2	3.5
1948	X	X	X	–0.1	4.2	5.3	4.8	4.7	3.6	4.3	4.0	3.8	3.1	3.4
1949	X	X	X	X	8.7	8.1	6.5	6.0	4.4	5.0	4.6	4.2	3.5	3.8
1950	X	X	X	X	X	7.4	5.4	5.1	3.4	4.3	3.9	3.6	2.9	3.3
1951	X	X	X	X	X	X	3.4	3.9	2.0	3.5	3.2	3.0	2.2	2.8
1952	X	X	X	X	X	X	X	4.4	1.3	3.6	3.2	2.9	2.0	2.6
1953	X	X	X	X	X	X	X	X	–1.6	3.2	2.8	2.6	1.6	2.4
1954	X	X	X	X	X	X	X	X	X	8.1	5.1	4.0	2.4	3.2
1955	X	X	X	X	X	X	X	X	X	X	2.1	2.0	0.5	2.0
1956	X	X	X	X	X	X	X	X	X	X	X	1.8	–0.2	2.0
1957	X	X	X	X	X	X	X	X	X	X	X	X	–2.3	2.0
1958	X	X	X	X	X	X	X	X	X	X	X	X	X	7.0
1959														

*Compound rates of growth

Following this procedure, you can find growth rates ranging all the way from —2.3 per cent, between 1957 and 1958, to +8.7 per cent, between 1949 and 1950, along with almost any other rate you would choose for various years and sequences of several years over the postwar period.

For example, if you want to demonstrate that the postwar growth rate through 1953 was less than 4% per year, you take off from 1946, include a drop of 0.1 per cent between 1946 and 1947, and come up with a growth rate for the 1946-1953 period of 3.9 per cent. But if you want to show it was quite high, you take off a year later, from 1947 (which drops out that dismal —0.1 per cent for 1947) and come up with a fine growth rate of 4.6 per cent for the 1947-1953 years.

Statistical Hocus-Pocus

That's what the Eckstein staff did. It took off at one end from a year when there was just about no growth, went to the Korean War boom year of 1953 at the other end, and got that average growth rate of 4.6 per cent. Then it took off from the Korean War boom year of 1953 and ran to the year 1959, when business was recovering from a recession and suffered through a steel strike of 116 days, to come up with its 2.4 per cent growth rate for the second postwar period. As the table indicates, by taking off a year later (1954) the average growth rate would have become 3.2 per cent, and if the take off had been 1949 it would have been 3.8 per cent.

There are those who, in nontechnical terms, would characterize this as statistical hocus-pocus. There are also those who would see in it an element of political hocus-pocus, too. This is because the years 1947-53, when the Eckstein staff found there had been the healthy 4.6 per cent growth rate, were roughly years when we had a Democratic president, while the anemic growth rate of 2.4 per cent it calculated for the subsequent years was for years of a Republican presidency.

Actually it can be shown that the civilian part of our economy has had more rapid growth during the Republican administration than it had during the Democratic years. If military expenditures are subtracted from the national ouput, the resulting growth rate for 1953 to 1959 is slightly higher than for 1947 to 1953.

However, we do not question the *bona fides* of the Eckstein staff. **But we do assert that it has produced a statistical picture of the postwar growth of the American economy which is dangerously misleading both at home and abroad.**

Abroad, the report appears to give official documentation to the propaganda line that the Soviet economy is running rings around the U.S. economy in growth, and that it is Communism a country should choose if it really wants to develop rapidly. Building on a much smaller economic base than the U.S.A., the Soviet Union — as well as almost every less advanced nation in the world — is bound to show a larger percentage increase in output than the U.S.A. But the Eckstein staff calculation gives the Communists ammunition they don't deserve.

Are We Facing A Crisis?

The contrast drawn by the Joint Committee staff in postwar U.S. growth rates suggests that we are facing scarcely less than a crisis through paralysis of our economic growth which calls for drastic remedies. But this, as the full 1947 to 1959 growth record set forth in the table makes clear, is very definitely not the case. Our over-all postwar rate of growth, as measured by the gross national product in physical terms, has been 3.5 per cent per year, a rate nearly double the long-term growth rate of 2 per cent per year between 1909 and 1939. In the continuing fluctuations in the rate of growth which more or less inevitably characterize a relatively free economy, we have had some downs in recent years. **But our economy is now on the upbeat again. And at the end of this year, the U.S. economic growth rate for the postwar period can be expected to be 3.7 per cent per year.**

It is extremely important for the United States to continue to maintain this rate of economic growth or even to surpass it. Upon this effort depends our capacity to meet our defense requirements without dangerous strain, to provide an adequate margin for foreign aid, to improve our own productive facilities, and to continue to raise our own standard of living.

How not only to maintain but possibly improve upon our postwar pace of economic growth will be the subject of strenuous debate in the months ahead. However, the debate will have a much better chance of being constructive if the postwar growth record is seen in proper perspective. To this end one of the first things to do is to junk panic rousing statistical portrayals such as that in the Eckstein report.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

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EEI Sales Conference (*Continued from page* 37)

"When you start promoting total electric living you are pitching for the whole house and you have to become a total house expert," Arthur Sworn Goldman, director of marketing of *House & Home* magazine pointed out.

If a house has a fine heating system in it, a long-term guarantee water heater, and adequate wiring, the cost of ownership will be less for the home owner, Goldman pointed out. The house price may be more but it will cost less for repairs, replacement and repainting and the Federal Housing Authority will require that the buyer have less total income.

Cultivate the lender and the appraiser also, Goldman told the utility men. Some lenders have been penalizing electric heat in their appraisal and income requirements, he pointed out. Other lenders were concerned about market acceptance of electric heat and were reducing the size of the mortgage by $1,400 to take care of the replacement to a conventional system later if the next buyer didn't like electric heat.

"Gold Medallions may well become a new status symbol in America," according to Fred J. Borch, General Electric Co's vice president, consumer products group.

The opportunity to sell the electric way is now, he said, because: The economic climate at the start of this decade insures the best environment in history to provide the means for a better way of life; and the industry has never before been so well prepared to offer the complete package of electrical living.

About 13 million families are able to afford Gold Medallion homes in the $14,000 price range now, he pointed out, but in 1970 the market will be 27 million.

The big challenge is to get GM homes built in volume, 4 million in the Sixties, he noted. "This is a mighty important way to help get the residential load back to its historic growth rate of 10% per year."

In opening the general sessions,

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which recorded the best attendance in years, E. O. George, vice president of Detroit Edison Co, and chairman of EEI's Sales Division Executive Committee, said, "We must achieve rapid acceptance of electric ranges, dryers, and water heaters. We must accelerate the successful development of the electric heating market."

To do this, here is how EEI leadership should be strengthened George said: **1.** All members should understand the difference between national advertising and local programming. **2.** Plan for the welfare of the electrical industries as a whole. "The place for local problems is at the local level." **3.** Build the program beyond its present magnitude through "the active financial participation of all EEI members."

Water Heating Rate a Problem

Allen S. King, president of Northern States Power Co, and an electric heating fan, told of success in his service area. "The customer took the play out of our hands. They insisted we do something," he said. There was no promotion, just word of mouth, according to King, and he said these customers were not the rich, but in the $15,000 to $18,000 range.

As for water heating, King pointed out that types of equipment and what rate to apply are the problems. Service inadequacy, not price, turned people to gas, he said, "Find a uniform standard of equipment and then manufacturers will get back into the program and give it their attention," he noted.

The future for the Live Better Electrically Program was outlined by Ralph Zeuthen, LBE program manager. Noting that the program had been considerably streamlined, Zeuthen said there is now a planning committee, a statement of policy which directs the program to take a competitive stand against other fuels, and a reduction in advertising subjects from eleven to five —the dryer, range, water heater, heating and cooling, and Medallion Home.

He also called for a booklet on house heating, "one of the most important things this industry can do."

If the General Sessions gave the over-all picture, it was in the group

(*Continued on page 96*)

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GENERAL ELECTRIC

EEI Sales Conference (*Continued from page* 95)

sessions that the individual market problems got a going over. Crammed in this year's meeting into one afternoon, the sessions, nevertheless, came up with some concrete answers to the electrical industry's dilemmas.

How to sell electric service over low cost gas and come up with some big load-producing total-electric buildings was detailed by Joe B. Browder, sales manager at Georgia Power Co.

The answer, Browder said, is a "gimmick"—a two-part rate for general service use. Part one is the usual rate structure utilizing the 30-minute integrated demand feature with the usual rate steps, and a proviso that all energy in excess of 200 hours use of demand would be billed at 1¢ per kwhr. Part two, designed specifically to encourage commercial electric cooking, says that any customer taking all of his service through one meter, and who has not less than 40% of his total connected load in active cooking and heating equipment, may at his option have his billing demand determined by load count rather than measured demand.

The part of the rate which disturbs management, Browder said, is when an existing customer being billed on the measured demand basis, who already has air conditioning, may install enough cooking and/or heating equipment to qualify for being billed by counted demand and his total electric bill may not even decrease, or at most, go up very little.

Herein, however, noted Browder, lies the secret of the rate and why the company has been successful in selling total-electric buildings. Disturbed-management notwithstanding, this has helped the "beat the gas campaigns." If the company loses any part of the load to gas it loses it all. Therefore, salesmen are trained to get the total load, and are given special recognition only for total electric jobs, Browder said.

Good street lighting is good public relations. The industry should have street lighting rates which are understandable to non-technical people, and a simple rate, not one that takes three and four pages to explain. A community should know all the benefits it will receive from improved street lighting. These are the views of Otter Tail Power Co's Executive Vice President Albert V. Hartl.

Customers are aware only of the effects of street lighting, not the cost or technical details, he said. If the individual considers street lighting poor he blames the utility.

(*Continued on page* 98)

ELECTRIC CAR donated by Illinois Power Co got a thorough looking over at the confab. Thirty-three utilities have now signed up to purchase this model

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P-4070, Elec. World
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

EEI Sales Conference (*Continued from page 96*)

Don't be afraid to change an installation within a period of a contract, he commented. If better types of street lighting become available, or equipment which would use more energy, use them.

Be concerned also with the relation of street lighting with your utility's owners, he said. "Assuming (they) are concerned primarily with the profitability of a company, have we established to them that street lighting is a profitable segment of our business?" The profitability of it should be demonstrated by proper cost studies, he said.

A sound rural sales program contributes to the total economy of the area, according to William R. Poole, vice president of sales, Toledo Edison Co.

Toward this objective what should management expect from a rural sales department? Poole said it would be to increase the company's rural revenue; to improve the overall area economy; to build customer confidence and good relations with the company; and to assist in developing an educational program.

"There is still an abundance of research problems in the rural electric field," Roy Bainer of the University of California noted.

He listed:

- Continued research in controlled environment in livestock production under temperature extremes.
- Research on adapting electric power to feed preparation, feeding, watering, and manure removal.
- Research in the field of automatic controls, telemetering and analysis of data.

When considering future research don't forget, applications of the heat pump, supplemental irrigation, improvement of milking equipment, and finishing of chopping hay by atmospheric drying, he said.

Youth Programs Are Important

Today's youth is not "going to Hell in a handbasket"; 97% are good citizens and worth thinking of when one considers America's future. This is the gist of Ebasco Services' W. L. Byrne's remarks in telling how youth programs can shape the destiny of tomorrow.

"If youth work is worth considering at all, it should be approached as a continuing long-range program, and, as such, rate a continuing place in your company's sales program and budget," he said.

To continue the changes wrought on today's farm—in plant and animal production through automation of farm processes—there is need for giving the future farm operator some introduction to the technical, scientific, and business skills that he will need to successfully manage and operate tomorrow's farm, Byrne said.

Lighting is the key to electrical space conditioning. Lighting levels at around 100 ft-c make it necessary to air conditioning space to insure year-round comfort. While air conditioning will eventually come to all buildings, certainly modern lighting will do much to speed its development. These facts, A. C. Barr, GE's manager of product planning and application in the large lamp department, told the industrial group.

Also there is the heating capacity of lighting, he said. "If you're interested in promoting the use of electric heat with your customers, I submit that promoting better lighting can be the best way to accomplish your goals in electric heating."

Detroit Edison's E. J. Hurley told the residential group that the 1960 Live Better Electrically Program is limited in promotion of water heaters, because the marketing problems have not been solved, but that 1961 will see renewed and vigorous attention.

J. H. K. Shannahan of Ebasco noted that manufacturers of Mobile Homes have recognized the value of the Gold and Bronze Medallions as a prestige item, and that there is in process a certification program for Electrically Heated Mobile Homes.

Home Service Committee Chairman, Judith O'Flaherty of Philadelphia Electric Co called for more effort in the recruitment of young women to home service careers with electric utilities.

More research was called for by J. S. Gracy, senior vice president at Florida Power Corp. This includes, basis research to design residential wiring systems for future needs; research to solve the problem of appliance servicing ("still one of the most serious roadblocks in the satisfactory use and promotion of some electrical appliances"); more research on standardization of sizes and parts to make it possible to bring down, or hold down, costs so that utilities can be more competitive in certain areas—especially in electric water heating.

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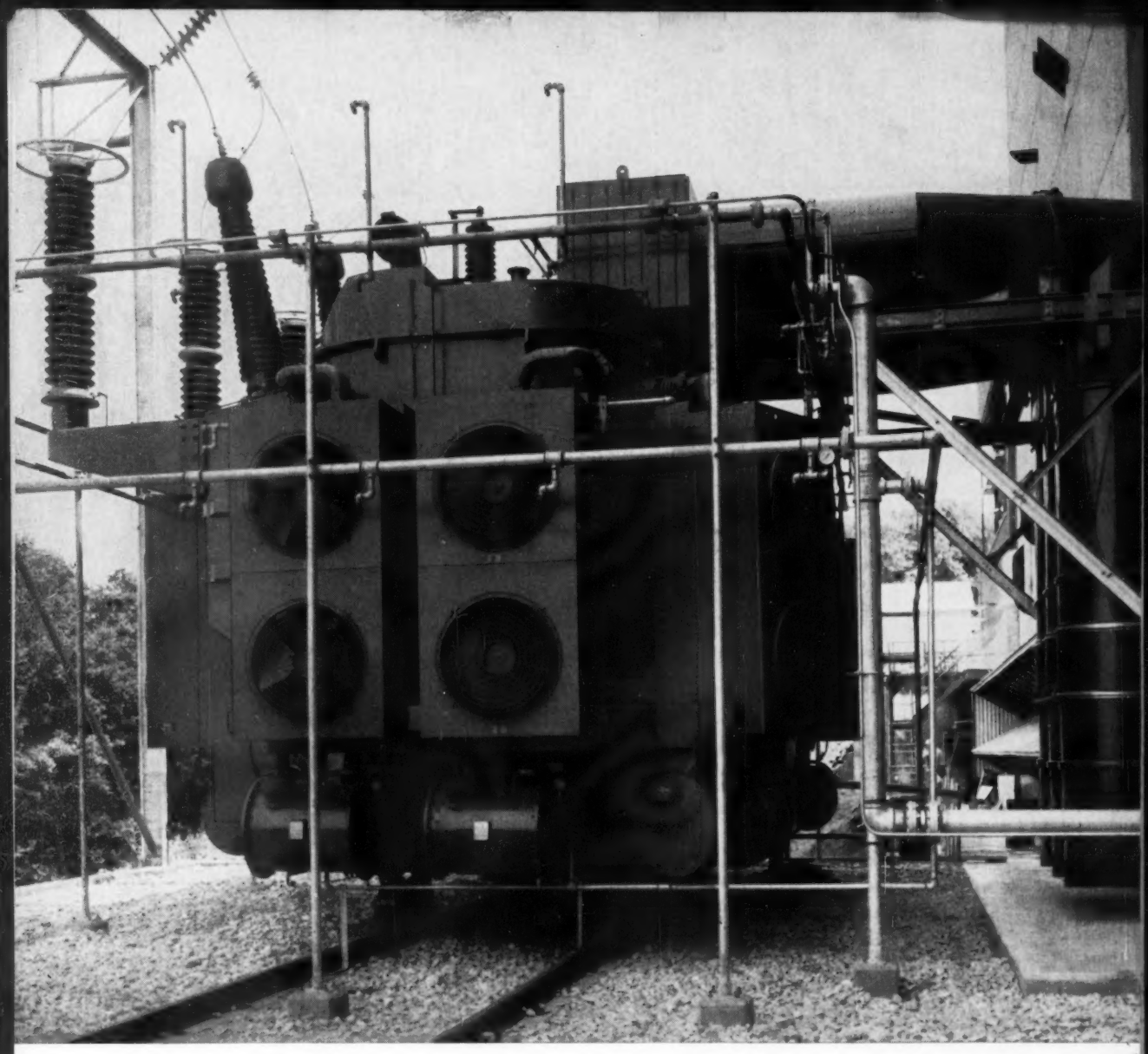

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